TELECOMMUNICATIONS

2N® SmartCom

Wireless Device Management over IP

User Manual

Version 1.9.0
Firmware 1.9.x

www.2n.cz

The 2N TELEKOMUNIKACE joint-stock company is a Czech manufacturer and supplier of telecommunications equipment.

The product family developed by 2N TELEKOMUNIKACE a.s. includes GSM gateways, private branch exchanges (PBX), and door and lift communicators. 2N TELEKOMUNIKACE a.s. has been ranked among the Czech top companies for years and represented a symbol of stability and prosperity on the telecommunications market for almost two decades. At present, we export our products into over 120 countries worldwide and have exclusive distributors on all continents.

2N TELEKOMUNIKACE administers the FAQ database to help you quickly find information and to answer your questions about 2N products and services. On www.faq.2n.cz you can find information regarding products adjustment and instructions for optimum use and procedures „What to do if...".

Declaration of Conformity

2N TELEKOMUNIKACE hereby declares that the 2N® SmartCOM product complies with all basic requirements and other relevant provisions of the 1999/5/EC directive. For the full wording of the Declaration of Conformity see the CD-ROM enclosed and at www.2n.cz.

The 2N TELEKOMUNIKACE company is the holder of the ISO 9001:2009 certificate. All development, production and distribution processes of the company are managed by this standard and guarantee a high quality, technical level and professional aspect of all our

Content

1. Product Overview

In this section, we introduce the **2N® SmartCOM** product, outline its application options and highlight the advantages following from its use. The section also includes safety precautions.
Here is what you can find in this section:

1.1 Product Description

The **2N® SmartCOM** GPRS communication unit is a new product developed and manufactured to provide the maximum utility value, quality and reliability. We hope you will be fully satisfied with the **2N® SmartCOM** for a long time. Use **2N® SmartCOM** in accordance herewith for the purposes it was designed and manufactured for.

2N® SmartCOM is designed for Internet connection via the GPRS network and data retransmission from peripherals connected to RS 232/485/M–Bus via the IP protocol and GPRS network to a data requesting server or device. Two relay outputs can be controlled and switched and parameters can be measured on two galvanically connected inputs.

Safety Precautions


Do not switch on **2N® SmartCOM** in the vicinity of medical apparatuses to avoid interference. The minimum distance of the antenna and pacemakers should be 0.5m at least.


Do not switch **2N® SmartCOM** aboard a plane.


Do not switch **2N® SmartCOM** near petrol stations, chemical facilities or sites where explosives are used.


Any mobile telephone use prohibition based on RF energy radiation applies to **2N® SmartCOM** too.


2N® SmartCOM may disturb the function of TV sets, radio sets and PCs.


Warning! **2N® SmartCOM** contains components that can be swallowed by small children (SIM card, antenna, etc.).


Never exceed the voltage value specified on the adapter. Check the available voltage range before connecting **2N® SmartCOM** to a different power supply.


When **2N® SmartCOM** comes to the end of its operational life, dispose of it in accordance with applicable regulations.


2N® SmartCOM is equipped with an external antenna connector. The antenna has to be located indoors for safety reasons.

Warning

- Do not place the unit near heat sources (such as space heaters, hot air heaters, etc.).
- **2N® SmartCOM** only works reliably under the conditions specified in this User Manual. Any unauthorised interventions and/or changes in use and operation may result in malfunction or destruction of the product.

1.2 Upgrade

The manufacturer reserves the right to modify **2N® SmartCOM** in order to improve its qualities.

Manual Version	Changes in Documentation
1.0.0	The User Manual corresponds to **2N® SmartCOM** FW version **1.0.x**.
1.1.0	The User Manual corresponds to **2N® SmartCOM** FW version **1.1.x**.
1.3.0	The User Manual corresponds to **2N® SmartCOM** FW version **1.3.x**.
1.4.0	The User Manual corresponds to **2N® SmartCOM** FW version **1.4.x**.
1.5.0	The User Manual corresponds to **2N® SmartCOM** FW version **1.5.x**.
1.6.0	The User Manual corresponds to **2N® SmartCOM** FW version **1.6.x**.
1.7.0	The User Manual corresponds to **2N® SmartCOM** FW version **1.7.x**.
1.8.0	The User Manual corresponds to **2N® SmartCOM** FW version **1.8.x**.
1.9.0	The User Manual corresponds to **2N® SmartCOM** FW version **1.9.x**.

Caution

- The manufacturer is committed to upgrading the firmware according to the clients' requirements. Refer to the 2N web sites www.2n.cz for the current **2N® SmartCOM** and GSM module firmware versions and User Manual updates.
- Refer to the Maintenance section for **2N® SmartCOM** firmware upgrade details.

1.3 Terms and Symbols Used

Symbols Used in Manual

The following symbols and pictograms are used in the manual:

Safety
- **Always** abide by this information to prevent persons from injury.

Warning
- **Always** abide by this information to prevent damage to the device.

Caution
- **Important information** for system functionality.

Tip
- **Useful information** for quick and efficient functionality.

Note
- Routines or advice for efficient use of the device.

```
AT Command
AT command stored in the hyper terminal.
```

Future Functions and Features

The grey–marked text in this document designates the functions and features that are under preparation or development at present.

2. Description and Installation

In this section we describe the **2N® SmartCOM** product and its installation. Here is what you can find in this section:

2.1 Basic Version Description

2N® SmartCOM consists of a board carrying a power supply, RS 232 and RS 485/M–Bus interfaces and a GSM module. The GSM module is responsible for a continuous Internet connection via GPRS and two relays for output contact control. Connectors for optional devices are located in the upper part of the **2N® SmartCOM** u nit. Refer to the figures below for description. The whole **2N® SmartCOM** system is enclosed in a solid aluminium case.

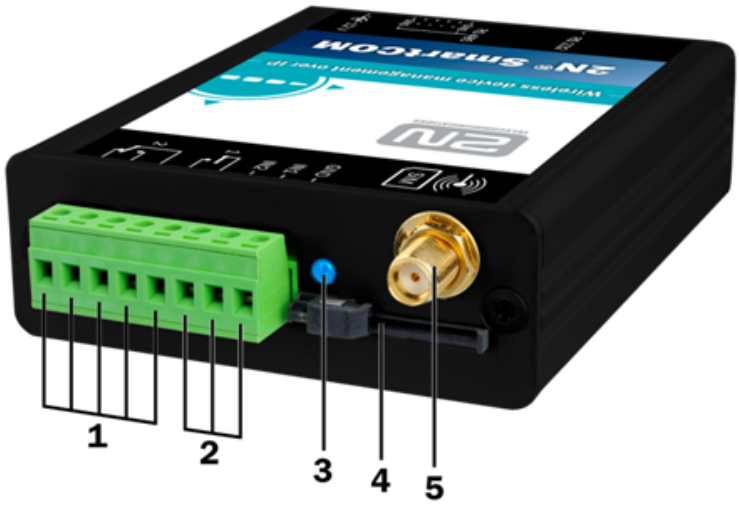


Figure: 2N® SmartCOM Description (Top View)

1. Relay output terminals
2. Input circuit terminals
3. GSM LED indicator
4. SIM holder
5. GSM antenna SMA connector

Figure: 2N® SmartCOM Connectors (Bottom View)

1. RS 232 bus connector
2. RS 485 bus connector
3. Power supply connector

2.2 PRO Version Description

2N® SmartCOM PRO contains all basic version interfaces plus a terminal for gel–lead–acid accumulator connection, a real time clock function, Wireless M–Bus and ZigBee (both optional) and Ethernet interface (optional). Refer to the figures below for description. The whole **2N® SmartCOM** system is enclosed in a solid aluminium case.

Figure: 2N® SmartCOM Description (Bottom View)

1. RS 232 connector
2. Power supply and battery connector:
   U_{in}+, U_{in}– – contacts for input supply voltage
   Batt+, Batt– – contacts for gel–lead–acid accumulator
3. RS 485/M–Bus/RS232 connector (depends on the device version)
4. Ethernet interface (optional)

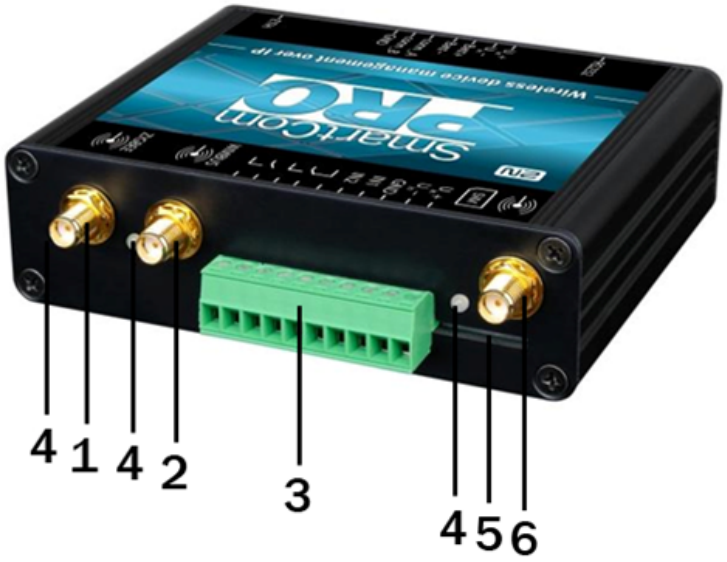


Figure: 2N® SmartCOM Connectors (Top View)

1. SMA connector for ZigBee antenna (optional)
2. SMA connector for Wireless M–Bus antenna (optional)
3. Input circuit terminal block:
   RE1, RE2 – relay contacts
   IN1, IN2 – input circuits (type is determined by jumper settings)
   GND – ground to be used with input circuits IN1 and IN2
   U_{in}+, U_{in}– – auxiliary contacts with supply voltage, to be used e.g. for connecting supply voltage to relays (directly connected to U_{in}+, U_{in}– contacts on 4–pin power supply connector)
4. Signalling LEDs (ZigBee, WMbus, GSM LED)
5. SIM holder
6. SMA connector for GSM antenna

2.3 Before You Start

Installation Conditions

- Install the **2N® SmartCOM** GSM antenna with respect to the signal quality in the location. Where the signal is poor, use a higher gain antenna (not included in the delivery).
- Install **2N® SmartCOM** off sensitive devices and human bodies to avoid EM interference.
- Refer to the Technical Parameters (S. 6) for the allowed range of working temperatures.
- **2N® SmartCOM** may not be operated on sites exposed to direct sunshine or in the vicinity of heat sources.
- **2N® SmartCOM** is designed for indoor use. Never expose it to rain, running water, condensation moisture, mist, etc.
- **2N® SmartCOM** may not be exposed to aggressive gases, acid vapours, solvents and similar chemicals.

Caution

- Make sure that you are equipped with all necessary technical means, particularly a GPRS supporting SIM card with PIN request disable or a PIN identical with that set in the **2N® SmartCOM** configuration.

2.4 Mounting

External Antenna Connection

Screw the enclosed antenna into the SMA antenna connector.

Figure: Antenna Connection

Caution

- Tighten the antenna connector **gently with your hand**; never use a tool!

Note

- The antenna should be located in one and the same building with **2N® SmartCOM** for safety reasons.

SIM Card Installation

Find the SIM card holder near the **2N® SmartCOM** top.

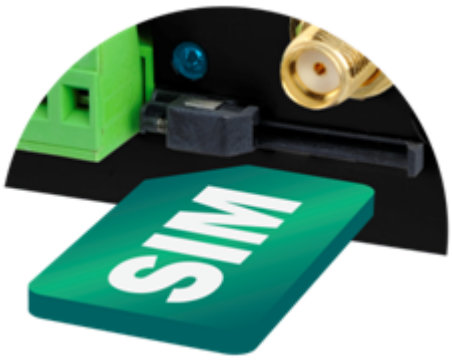


Figure: SIM Card Installation

1. Insert the SIM card in the holder.
2. Push the card in until it clicks into position.

Caution

- Make sure that the GSM provider's SIM card is intended for the GSM network supported by your **2N® SmartCOM** version and that GPRS–based data transmission is activated.
- Make sure that the SIM card does not request the PIN or that the PIN is identical with that set in the **2N® SmartCOM** configuration.
- Remember to set the relevant SIM and provider's services (call forwarding, call barring, preferred networks, SMS centre, etc.) on your mobile phone (**2N® MeterModem**) before inserting the SIM card in **2N® SmartCOM.**

Power Supply

2N® SmartCOM is DC supplied from a 12V/0.5A power adapter. Make sure that the voltage value and polarity comply with the data specified at the **2N® SmartCOM** powe r connector before connecting your **2N® SmartCOM** to an adapter other than that included in the delivery.

2N® SmartCOM PRO is DC supplied in the range of 5–50V. Make sure that the voltage value and polarity comply with the data specified at the **2N® SmartCOM** powe r connector before connecting your **2N® SmartCOM** to an adapter other than that included in the delivery. Connect the supply voltage to the 4–pin connector next to the RS232 connector. You can also connect there a gel–lead–acid accumulator as a power supply backup. The supply voltage is also present on the 10–pin input circuit terminal block on the opposite side of the device. These contacts can be used as auxiliary, e.g. for connecting supply voltage to relays.

Warning

- **Never connect** the power supply until you have connected the antenna to avoid the GSM module damage.
- **Never connect any incompliant power supply** to avoid electric accident or system damage

3. Function and Use

In this section we provide the basic and extended functions of the **2N® SmartCOM** product.
Here is what you can find in this section:

3.1 Putting in Operation

Operational state is **2N® SmartCOM**'s main function. In this state, periodic data readouts from input circuits are made. **2N® SmartCOM** responds to queries from the superior data concentrator, which can be the **2N® SmartCOM** server, monitors the events on the RS-232 / 485 / M-Bus interfaces and sends the acquired data to the server via GPRS, or Ethernet in the case of the PRO ETH version.

Initialisation

Insert the PIN–disabled data SIM card in **2N® SmartCOM** and connect the GSM antenna and power supply as instructed in Subs. 2.3., Mounting.
When the **2N® SmartCOM** power supply is connected, the LED indicator on the upper side of the module flashes three times quickly and then starts flashing in longer intervals. Refer to Subs. 3.2. for LED status details. The GPRS module starts communicating with the provider in about 10 seconds trying to log in and obtain the IP address. The LED starts shining constantly to indicate a successful login.

Tip

- **2N® SmartCOM** is working if the LED indicator is shining, thus indicating a successful mobile provider connection and IP address assignment.

To identify the **2N® SmartCOM** IP address assigned by the mobile provider or perform the basic configuration upon power up, get connected via the serial port (RS 232). The port is in the data mode upon power up, retransmitting all data from the input to the GPRS network. Use the +++ sequence preceded and followed by a 1–second delay to switch into the configuration mode. When your **2N® SmartCOM** replies OK, start configuring using the AT commands as listed below.

Restart the serial port to return to the data mode. To do so, you can either send the ATO command or disconnect **2N® SmartCOM** from the power supply.

Tip

- **2N® SmartCOM** can also be configured via Terminal Config. Refer to S. 6.
- If you cannot use a PC, make the basic settings using SMS messages. Refer to S. 5 for details.

When your **2N® SmartCOM** has been programmed as required, connect the device to the available serial ports RS-232 / 485 / M-Bus. Launch the hyperterminal and get connected to the **2N® SmartCOM** public IP address via port 10000, which, together with the serial port, can be used for configuring. Use port 10001 for retransmitting data to RS-232 and port 10002 for retransmitting data to RS-485 / M-Bus.

3.2 GSM LED Indicator

Here the variable statuses of the server connection indicating LED are described. This LED can have two functions: signals the terminal connection to GPRS in the stand-alone mode and to the SC server in the TCP client mode both for **2N® SmartCOM** and **2N® SmartCOM PRO**.

For **2N® SmartCOM PRO ETH**, however, set the scchled1 parameter to determine whether the LED shall signal the GSM or ETH interface state.

Figure: Front Panel with LED Indicator

1. **NO LIGHT –** POWER OFF – indicates that the 12V power supply of the GPRS module is disconnected or works erroneously, or the fuse is defective.
2. **THREE QUICK FLASHES** – START or RESTART – indicates the system start or restart. This status must occur whenever the power supply is connected.
3. **SLOW FLASHING** – INITIALISATION – indicates the process of module login to the provider and IP network.
4. **VERY QUICK FLASHING** – ERROR – indicates an error due to a wrong PIN, missing SIM card, or fewer than three remaining PIN entering attempts.
5. **CONSTANT SHINING** – OK – **2N® SmartCOM** logged in, IP address assigned, connection successfully established. A quick flash indicates data transmission in this status.

3.3 Input and Output Circuits

This subsection describes the input and output circuits of **2N® SmartCOM**including main use, control and location.

Tip

- **2N® SmartCOM** is equipped with reliable terminals for easier and faster connection.

Input Circuits

2N® SmartCOM is equipped with two inputs, which are mutually galvanically connected with the GND reference point (have a common GROUND). Remember to keep the parameters specified in the Technical Parameters at the end of this manual.

The input circuits can work in three modes – voltage, current or logical levels – as configured.

Voltage measurement

Voltage can be measured in the range between 0 and 10V DC. Make sure that the **2N® SmartCOM** jumpers are set as shown in Figure 3.3 before using this mode. Use the AT commands listed in Subs. 4.2 (ADC) for reading and calibration.

Current measurement

Electric current can be measured in the range between 4 and 20 mA. Make sure that the **2N® SmartCOM** jumpers are set as shown in Figure 3.3 before using this mode. Use the AT commands listed in Subs. 4.2 (ADC) for reading and calibration.

Logical level monitoring

You can monitor the logical levels of voltage and current signals. Use other commands that those intended for classic measurements and define the threshold levels. Again, use the AT commands for reading values on input circuits.

Pulse counting on S0 inputs

Make sure that the jumpers are set as shown in the figure below for pulse counting on S0 inputs. The S0 input has thus a power supply of its own and can be connected directly to the switch or relay contacts. The counter is disabled by default and has to be enabled using the AT commands included in Subs. 4.2.

The figures below show the location of jumpers for current/voltage input switching. Release the screws and remove the case cover to get access to the jumpers. See the figure to the right for correct setting.

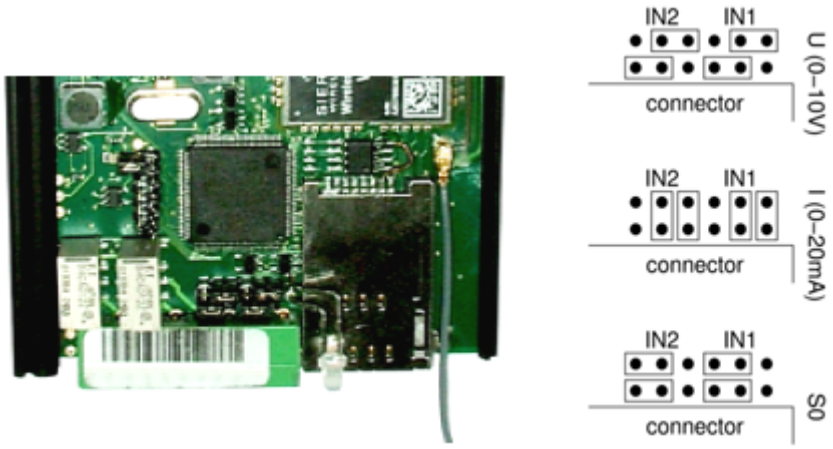


Figure: Jumper Setting–Basic Version

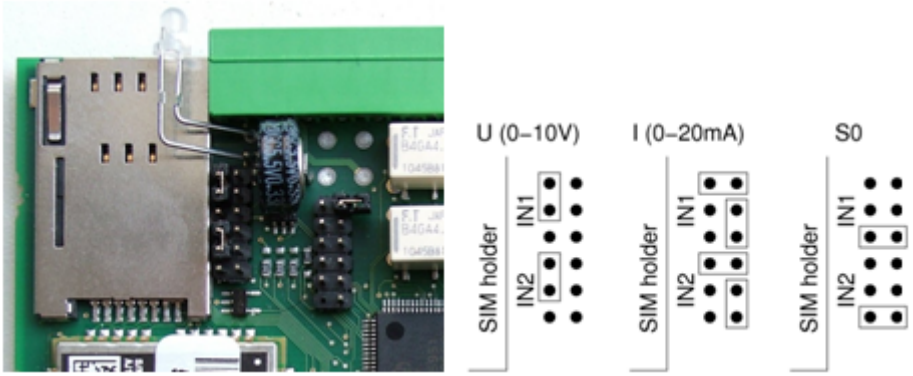


Figure: Jumper Setting–PRO version

Output Circuits

2N® SmartCOM is equipped with two relay outputs for turning on/off electrical appliances (by an additional power switch, depending on their power input), or signalling, control and so on. Remember to keep the parameters specified in the Technical parameters at the end of this manual.

You can control the relay outputs with the AT commands from the CMD mode of the RS 232 interface, via a remote GPRS connection to the SIM card IP address, or using an SMS message. Refer to Subs. 4.2 for AT command details and S. 5 for SMS configuration details.

Caution

- **Attention! –** Any manual setting is valid until the next change or device power off. **2N® SmartCOM** does not keep in mind the relay settings and restores the default status upon power up.
- Set the parameter determining the relay position upon power up to **2** to make your **2N® SmartCOM** remember the last contact position before power off. Refer to the configuration subsections for more details.

RS-232 and RS-485 / M–Bus Interfaces

Find the interface connectors on the bottom side of **2N® SmartCOM**. Refer to Subs. 2.1. A 9-pin D-sub connector is used for RS-232 and a 6-pin RJ12 connector is used for RS-485 or M-Bus in the **2N® SmartCOM** basic version. Follow the wiring instructions on the label. **2N® SmartCOM PRO** and **2N® SmartCOM PRO ETH** use a 3-pin WAGO terminal for bus connection located on the bottom panel next to the power supply terminals. Follow the wiring instructions on the label.

IP Access

To access **2N® SmartCOM** via the IP protocol, use a Telnet supporting terminal and get connected to the **2N® SmartCOM** public IP address. **2N® SmartCOM** must be in mode 3 , STANDALONE, to provide access to three ports, each of which serves one interface.

Tip

- **Port 10000** – helps you configure, control the output relays and measure quantities on the input circuits.
- **Port 10001** – works as a data pipe to port RS 232 retransmitting all RS 232 events to GPRS.
- **Port 10002** – works as a data pipe to port RS 485 / M–Bus retransmitting all RS 485 events to GPRS.

Gel–Lead–Acid Accumulator Charger

This function is available in the **2N® SmartCOM PRO** version only, which contains an intelligent charger for an external gel–lead–acid accumulator. Charging is controlled automatically and terminated when the accumulator has been completely charged. In the case of power failure, the system is fed continuously by the accumulator and, upon power recovery, the accumulator is charged automatically. A 6V or 12V accumulator can be used and charged on condition that the power voltage is 1V higher at least than the maximum voltage of the accumulator.

Real Time Clock

This function is available in the **2N® SmartCOM PRO** version only. The real time clock is backed up by a super capacitor, which keeps it running for 2 days in the event of switch–off or power failure. The clock is programmed via the configuration AT interface or from the **2N® SmartCOM** Server automatically.

Wireless M–Bus Interface

This function is available in the **2N® SmartCOM PRO** version only, which is equipped with an optional Wireless M-Bus interface. The WM-Bus interface parameters depend on the module used (radio frequency, e.g.). You can define up to 64 meters from which the device can collect readings. Having received a WM-Bus message from a meter defined in the meter table, **2N® SmartCOM PRO** saves the message into a circular buffer in the internal memory. The saved data can be retrieved and deleted starting from the oldest record. When the memory fills up, the oldest data are deleted automatically to make space to new records. You can define the minimum reading interval for each meter. Any reading received from a meter before the end of this interval will not be stored.

The WM-Bus module can work and support encrypted messages in four modes: T1, S1, C1 and T1+C. In the basic configuration, the terminal does not decrypt messages and saves them as received. If you enter the correct encryption key and enable decryption, the received message will be decrypted and saved as a decrypted message. The encryption keys are not stored in the terminal memory for safety reasons, but written directly into the module. Therefore, if encryption fails, make sure that the device is transmitting properly, check the device settings in the terminal and re-enter the encryption key.

ZigBee Interface

This function is available in the **2N® SmartCOM PRO** and **2N® SmartCOM PRO ETH** versions only, which are equipped with an optional ZigBee communication module. The ZigBee interface parameters depend on the module used (radio frequency, e.g.). You can define up to 16 devices for mutual communication. The IEEE 802.15.4 – ZigBee communication technology is a member of the wireless PAN group (Personal Area Networks). Another, very popular PAN member, IEEE 802.15.1 – Bluetooth, is widely used in consumer electronics, but is not suitable for all industrial applications. This is why a new wireless communication standard, ZigBee, has been developed for industrial automation. At present, over sixty firms including world leaders in automation are involved in ZigBee development and improvement. ZigBee has been designed as a simple and flexible technology for extensive wireless networks where no large data volumes are transmitted. Reliability, simple and undemanding implementation, low power requirements and, last but not least, a good price make ZigBee a perfect solution. Like Bluetooth, ZigBee is intended for connection of low-power devices in PANs over distances of up to 75 metres. Being equipped with multi-drop ad-hoc routing, ZigBee also provides communication over longer distances without requiring direct visibility of the devices connected. It is widely used in industrial applications and sensor networks as it needs no special licence (has a general licence). Its working bands are approximately 868 MHz, 902–928 MHz and 2.4 GHz and transmisition rates amount to 20, 40, 250 kbps.

3.4 Input Calibration

A 10-bit A/D converter is connected to the IN1 and IN2 input terminals, which converts the measured value to a number ranging between 0 and 1023. Practically, the 0 - 1020 range is used; the remaining three steps are used for overvoltage detection.

The purpose of calibration is to compensate the inaccuracy of components and external factors and to ensure that the 960 value of the A/D converter matches exactly 10V in each input. The value usually oscillates slightly around this point. Let us give an example: suppose you place two terminals next to each other under identical external conditions. One terminal will measure 966 and the other 957 for 10V. Calibrate the input to eliminate such inconsistency.

Note

- Keep in mind that an uncalibrated input is not non-functional. It is able to measure and read values less precisely, but sufficiently for rough voltage or current detection.

For calibration, use the terminals and AT commands described in Subs. 4.2, or the Terminal Config tool - refer to S. 6 - for setting and application details. The following figure shows the calibration diagram and basic principle. The meaning of the curves are explained below.

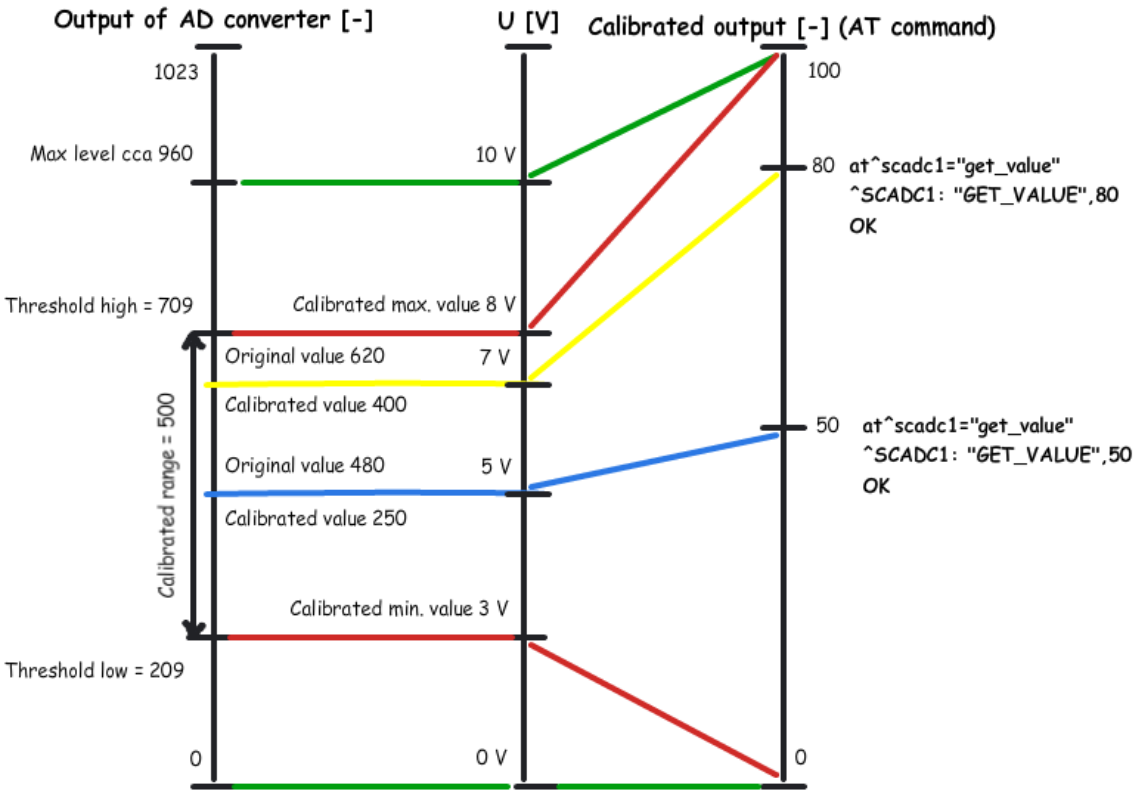


Figure: Calibration Diagram

– The green lines indicate that no calibration has been made yet. The A/D converter

works in the whole range and deviations may occur from the actual value measured on the input. If you, in this situation, set Threshold low to 0V and Threshold high to 10V on the input, the terminal will be calibrated for 10V precisely. For 0 on the input, the AT command will return 0. For 10, we obtain 100. Thus, the calibrated input can be considered 0 - 100% of the calibrated range.

– The red lines mean that the input has been calibrated to the interval of 3 to 8V, i.e. to the range of 5V. This range now represents new measurement limits. If you apply 3V or less on the input, you are in the calibrated min area and the AT command will return 0. If you apply 8V or more, you are in the calibrated max area and the AT command will return 100. This means that the measured range width has narrowed by 50% and 0 - 100% is now mapped to the input range of 3 - 8V.

– The blue line is an example of measuring in the calibrated range of 0 to 10V. Apply precisely one half of the calibrated voltage, i.e. 5V, to the input. The AT command will return 50, i.e. one half of the 0 - 100 range again. In this case, 5V is the centre of the calibrated range. If, however, the range was shifted, the value would be shifted too as shown below.

– The yellow line shows the case that 7V is applied to the input. In case you measure 7V in the calibrated 10V range, the AT command will return 70 as 70 represents 70% of the calibrated range. But if the range is just 3 to 8V as in the red case, 7V will represent 80% of the calibrated range of 5V and the AT command will return 80.

- If you use the calibrated input for reading logic values, keep in mind that the calibrated area is considered unstable. **Values lower than the set minimum will be 0 and those exceeding the maximum will be 1.** No value is guaranteed in an unstable area and a spurious state change may occur any time in the interval. Practically, the decisive level is near the middle of the set interval.

4. Configuration by Terminal

In this section we describe the **2N® SmartCOM** configuration using AT commands entered into the command line.
Here is what you can find in this section:

4.1 Configuration

The basic **2N® SmartCOM** configuration and firmware download take place during the manufacturing process. In general, no additional configuration is necessary except for GPRS connection to the Internet on the GSM module and the port baud rates, which may be different depending on the providers and types of peripherals. You can configure **2N® SmartCOM** in one of the following two ways.

- **Via the RS-232 serial interface; or**
- **Via the IP interface.**

Configuration via RS 232

The RS-232 port is always in the data mode upon power up, which means that it retransmits all captured events to GPRS port 10001. Therefore, to configure **2N® SmartCOM** via the serial port, switch the port into the command mode first and then get connected to it using your PC serial port. The baud rate is 115,200 bps by default. Now enter the following sequence of characters, preceded and followed by a 1–second delay, into the terminal:

```
+++
```

When **2N® SmartCOM** answers OK, you can start configuring the device using the AT commands listed in Subs. 4.2.

Restart the RS-232 port when you have finished configuring to return into the data mode. Send the following command:

```
at^scport1="restart"
```

Configuration via IP

If you know the **2N® SmartCOM** public IP address, you can configure the device remotely too using the IP protocol. If not, connect to **2N® SmartCOM** using RS-232 as described above and send one of the following commands (for GPRS/Ethernet):

```
at^sccfg="local_ip"
at^sceth="local_ip"
```

2N® SmartCOM will send you the IP address as negotiated with the provider or assigned by the DHCP server in the Ethernet case. If a fixed public IP address is activated on the SIM card, the SIM will always use this IP address. If a dynamic public IP address is used, check the IP address whenever your restart the device.

Caution

- **Make sure that the IP address assigned to the SIM card is public.** It is because you will not be able to establish remote connection to **2N® SmartCOM** in the STANDALONE mode if an IP address from the provider's internal range is used. The **2N® SmartCOM** address need not be public if you use the TCPCLIENT server connection.

If you know the public IP address, launch the Putty and get connected via port 10000, which, together with the serial port, can also be used for configuring. Port 10000 is used for configuration, input data reading and output control in the IP domain. It is in the command mode upon power up and thus need neither be switched nor restarted after configuration.

Note

- This port requires the safety password if configured so.

Caution

- If your **2N® SmartCOM** fails to respond to incoming TCP connections, check the status of the port to which you are connecting. If the port is in the command mode, notification on incoming connection is sent to the line (RING is displayed). Hence, enter the 'ata' command for answer or set automatic answering by parameter ats0. Refer to the **General Commands** subsection in the **List of supported AT commands** below.

4.2 List of Supported AT Commands

This subsection describes all the AT commands that can be used for **2N® SmartCOM** configuration, including precise format and function specification.

2N® SmartCOM GSM Commands

These commands help configure the connection to the GPRS network.

```
at^sccfg="mode",2
```

- Enter the command to set the **2N® SmartCOM** operating mode. There are three options:
  - TCPCLIENT mode (1) - **2N® SmartCOM** connects and retransmits data from its ports to the selected server.
  - STANDALONE mode (3) - **2N® SmartCOM** works as a server to which clients get connected (transparent TCP – serial port transmission).
  - DATA_OFF mode - **2N® SmartCOM** GSM/UMTS module does nor log in to the data network but waits for SMS.

Tip

- Enter the mode number or name or select a port. The AT command then looks as follows:

```
at^sccfg="mode","tcpclient"
```

Caution

- The ETH port is visible in the network in the DATA_OFF mode. PING is possible, but establishes no outgoing connection and rejects any incoming connection.

```
at^sccfg="gprs_apn","internet.open"
```

- Enter the command to set the APN to the mobile provider. The configuration for O2 CZ is used as an example.

```
at^sccfg="gprs_user","internet"
at^sccfg="gprs_pass","hds6cd5"
```

- These two commands help set the user name and password for authentication by the provider. Most providers use no authentication. If your provider requires one, ask the provider to supply the necessary data.

```
at^sccfg="local_ip"
```

- Enter the command to make **2N® SmartCOM** return the IP addressed assigned by the provider.

```
at^sccfg="server_ip","90.182.112.54"
```

- Enter the command to set the IP address of the server to which **2N® SmartCOM** should connect in mode 1.

```
at^sccfg="server_port","1564"
```

- Enter the command to set the server port to which **2N® SmartCOM** should connect in mode 1.

```
at^sccfg="auth_pass","xJ32ppp_v1"
```

- Enter the command to set the authorisation password for the above specified server.

```
at^sccfg="sim_pin","1156"
```

- Enter the command to set the PIN to be entered upon power up.

```
at^sccfg="auth_ip",1
```

- Switch on / off access authorisation according to IP addresses.

```
at^sccfg="encrypt",1
```

- Set the encryption mode for **2N® SmartCOM** - server communication. The setting options are 0–2.
  - Mode 0 DISABLED – **2N® SmartCOM** encrypts no data.
  - Mode 1 OPTIONAL – **2N® SmartCOM** encrypts data if the counterparty requires so.
  - Mode 2 FORCED – **2N® SmartCOM** encrypts all outgoing data.

```
at^sccfg="encrypt_key","E2978FE2978FE2978FE2978FE2978F20"
```

- Set the encryption key using 32 valid (hexa) characters, which makes 16 ASCII, via the ControlPanel.

```
at^sccfg="save"
```

- Enter the command to save changes.

```
at^sccfg="restart"
```

- Enter the command to restart **2N® SmartCOM**.

```
at^sccfg="srestart"
```

- Save the changes and restart **2N® SmartCOM.**

```
at^sccfg?
```

- This command displays the currently set interface values.

```
^SCCFG: "MODE",1
^SCCFG: "GPRS_APN","publicip.t-mobile.cz"
^SCCFG: "GPRS_USER","internet"
^SCCFG: "GPRS_PASS","hfsdj515d"
^SCCFG: "LOCAL_IP","89.24.3.195"
^SCCFG: "SIM_PIN","1234"
^SCCFG: "AUTH_IP",0
```

```
at^sccfg=?
```

- This command displays the port value setting options.

```
^SCCFG: "MODE",1-3
^SCCFG: "GPRS_APN","32"
^SCCFG: "GPRS_USER","32"
^SCCFG: "GPRS_PASS","32"
^SCCFG: "LOCAL_IP"
^SCCFG: "SIM_PIN","16"
^SCCFG: "AUTH_IP,0-1
^SCCFG: "SAVE"
^SCCFG: "RESTART"
^SCCFG: "SRESTART"
```

Port 1 (RS 232) SC Commands

These commands are used for setting the RS 232 parameters.

```
at^scport1="baudrate",9600
```

- Enter the command to set the baud rate to 9,600 bps.

```
at^scport1="baudrate",115200
```

- Enter the command to set the baud rate to 115,200 bps.

```
at^scport1="baudrate",230400
```

- Enter the command to set the baud rate to 230 400bps.
- The baud rate can be set to 110 – 230,400 in standard steps.

```
at^scport1="data_bits",8
```

- Enter the command to set the data bits to 8. Setting options: 5-8.

```
at^scport1="stop_bits",2
```

- Enter the command to set the stop bits to 2. Setting options: 1-2.

```
at^scport1="parity",2
```

Enter the command to set the parity check type. Setting options: 0-4.

- 0 – none
- 1 – even
- 2 – odd
- 3 – constant 1
- 4 - constant 0

```
at^scport1="flowcontrol",1
```

- Enter the command to set the flow control type. Setting options 0-1.
  - 0 - no flow control
  - 1 - hardware flow control

```
at^scport1="save"
```

- Enter the command to save the changes.

```
at^scport1="restart"
```

- Enter the command to restart the port.

```
at^scport1="srestart"
```

- Enter the command to save the changes and restart the interface.

```
at^scport1?
```

- Enter the command to display the currently set port values.

```
at^scport1=?
```

- Enter the command to display the port setting options.

```
^SCPORT1: "BAUDRATE",110-230400
^SCPORT1: "DATA_BITS",5-8
^SCPORT1: "STOP_BITS",1-2
^SCPORT1: "PARITY",0-4
^SCPORT1: "FLOWCONTROL",0-1
^SCPORT1: "SAVE"
^SCPORT1: "RESTART"
^SCPORT1: "SRESTART"
```

Port 2 (RS 485/M-Bus) SC Commands

These commands are used for setting the RS 485/M-Bus parameters.

```
at^scport2="baudrate",9600
```

- Enter the command to set the baud rate to 9,600 bps.

```
at^scport2="baudrate",115200
```

- Enter the command to set the baud rate to 115,200 bps.

```
at^scport2="baudrate",230400
```

- Enter the command to set the baud rate to 230,400 bps.
- The baud rate can be set to 110 – 230,400 in standard steps.

```
at^scport2="data_bits",8
```

- Enter the command to set the data bits to 8. Setting options: 5-8.

```
at^scport2="stop_bits",2
```

- Enter the command to set the stop bits to 2. Setting options: 1-2.

```
at^scport2="parity",2
```

- Enter the command to set the parity check type. Setting options: 0-4.

```
at^scport2="save"
```

- Enter the command to save the changes.

```
at^scport2="restart"
```

- Enter the command to restart the port.

```
at^scport2="srestart"
```

- Enter the command to save the changes and restart the interface.

```
at^scport2?
```

- Enter the command to display the currently set port values.

```
^SCPORT2: "BAUDRATE",9600
^SCPORT2: "DATA_BITS",8
^SCPORT2: "STOP_BITS",1
^SCPORT2: "PARITY",0
```

```
at^scport2=?
```

- Enter the command to display the port setting options.

Relay Outputs

These commands are used for relay output control.

```
at^screl1?
```

- Enter the command to identify the status of relay 1.

```
at^screl1=0
```

- Enter the command to open relay 1.

```
at^screl1=0,0
```

- Enter the command to open relay 1. The relay will be open after the terminal restart.

```
at^screl1=0,1
```

- Enter the command to open relay 1. The relay will be closed after the terminal restart.

```
at^screl1=0,2
```

- Enter the command to open relay 1. The relay will be in the position as before restart after the terminal restart.

```
at^screl1=1
```

- Enter the command to close relay 1.

```
at^screl1=1,0
```

- Enter the command to close relay 1. The relay will be open after the terminal restart.

```
at^screl1=1,1
```

- Enter the command to close relay 1. The relay will be closed after the terminal restart.

```
at^screl1=1,2
```

- Enter the command to close relay 1. The relay will be in the position as before restart after the terminal restart.

```
at^screl2?
```

- Enter the command to identify the status of relay 2.

```
at^screl2=0
```

- Enter the command to change the status of relay 2.

```
at^screl2=0,0
```

- Enter the command to change the status of relay 2. The relay will be in this position after restart.

```
at^screl2=0,1
```

- Enter the command to change the status of relay 2. The relay will be in the opposite position after restart.

```
at^screl2=0,2
```

- Enter the command to change the status of relay 2. The relay will be in the position as before restart after the terminal restart.

```
at^screl2=1
```

- Enter the command to change the status of relay 2.

```
at^screl2=1,0
```

- Enter the command to change the status of relay 2. The relay will be in the opposite position after restart.

```
at^screl2=1,1
```

- Enter the command to change the status of relay 2. The relay will be in this position after restart.

```
at^screl2=1,2
```

- Enter the command to change the status of relay 2. The relay will be in the position as before restart after the terminal restart.

ADC – Input Circuits

These commands help control the input circuits, set calibration and make measurements.

```
at^scadc1="get_value"
```

- Enter the command to measure the value of the selected port and send the measured value.

```
at^scadc1="adc_value"
```

- Enter the command to make the measurement and return the A/D converter value.

```
at^scadc1="calib_min"
```

- Enter the command to make automatic port calibration according to the currently measured value.

```
at^scadc1="calib_max"
```

- Enter the command to make automatic port calibration according to the currently measured value.

```
at^scadc1="threshold_low",200
```

- Manual calibration setting (minimum values). Setting options: 0 – 960.

```
at^scadc1="threshold_high",250
```

- Manual calibration setting (maximum values). Setting options: 0 – 960.

```
at^scadc1="save"
```

- Enter the command to save the changes.

```
at^scadc1?
```

- Enter the command to display the currently set port values.

```
at^scadc1=?
```

- Enter the command to display the port setting options.

```
at^scadc2="get_value"
```

- Enter the command to measure the value of the selected port and send the measured value.

```
at^scadc2="adc_value"
```

- Enter the command to make the measurement and return the A/D converter value.

```
at^scadc2="calib_min"
```

- Enter the command to make automatic port calibration according to the currently measured value.

```
at^scadc2="calib_max"
```

- Enter the command to make automatic port calibration according to the currently measured value.

```
at^scadc2="threshold_low",300
```

- Manual calibration setting (minimum values). Setting options: 0 – 960.

```
at^scadc2="threshold_high",350
```

- Manual calibration setting (maximum values). Setting options: 0 – 960.

```
at^scadc2="save"
```

- Enter the command to save the changes.

```
at^scadc2?
```

- Enter the command to display the currently set port values.

```
at^scadc2=?
```

- Enter the command to display the port setting options.

```
at^scdin1="get_value"
```

- Enter the command to detect the logical level on the port and send value 1/0.

```
at^scdin1="adc_value"
```

- Enter the command to make the measurement and return the A/D converter value.

```
at^scdin1="calib_min"
```

- Enter the command to make automatic port calibration according to the currently measured value.

```
at^scdin1="calib_max"
```

- Enter the command to make automatic port calibration according to the currently measured value.

```
at^scdin1="threshold_low",400
```

- Manual calibration setting (minimum values). Setting options: 0 – 960.

```
at^scdin1="threshold_high",450
```

- Manual calibration setting (maximum values). Setting options: 0 – 960.

```
at^scdin1="save"
```

- Enter the command to save the changes.

```
at^scdin1?
```

- Enter the command to display the currently set port values.

```
at^scdin1=?
```

- Enter the command to display the port setting options.

```
at^scdin2="get_value"
```

- Enter the command to detect the logical level on the port and send value 1/0.

```
at^scdin2="adc_value"
```

- Enter the command to make the measurement and return the A/D converter value.

```
at^scdin2="calib_min"
```

- Enter the command to make automatic port calibration according to the currently measured value.

```
at^scdin2="calib_max"
```

- Enter the command to make automatic port calibration according to the currently measured value.

```
at^scdin2="threshold_low",500
```

- Manual calibration setting (minimum values). Setting options: 0 – 960.

```
at^scdin2="threshold_high",550
```

- Manual calibration setting (maximum values). Setting options: 0 – 960.

```
at^scdin2="save"
```

- Enter the command to save the changes.

```
at^scdin2?
```

- Enter the command to display the currently set port values.

```
at^scdin2=?
```

- Enter the command to display the port setting options.

S0 – Pulse Counting

The commands below are used for pulse counter state setting and reading out on S0 inputs.

```
at^scpulse1="state"
```

- Enter the command to know the current states of the input 1 counter.
  - COUNTING- counting in progress
  - STOPPED- counting stopped

```
at^scpulse1="get_value"
```

- Enter the command to read out the counter state.

```
at^scpulse1="set_value",100
```

- Enter the command to set the count of counter pulses in case you do not want to start from 0. In this case, 100 will be set. The available range is 0 – 4294967295.

```
at^scpulse1="stimer",60
```

- Enter the command to define the intervals in seconds for storing the counter value in the EEPROM. The available range is 5 – 10000s.

```
at^scpulse1="start"
```

- Enter the command to enable pulse counting on input 1.

```
at^scpulse1="stop"
```

- Enter the command to disable pulse counting on input 1.

```
at^scpulse1="clear"
```

- Enter the command to clear the input 1 counter.

```
at^scpulse1="save"
```

- Enter the command to store the counter value in the EEPROM manually.

```
at^scpulse1?
```

- Enter the command to display the current interface settings.

```
at^scpulse1=?
```

- Enter the command to display the setting options for the interface.

```
at^scpulse2="state"
```

- Enter the comma1nd to know the current states of the input 2 counter.
  - COUNTING- counting in progress
  - STOPPED- counting stopped

```
at^scpulse2="get_value"
```

- Enter the command to read out the counter state.

```
at^scpulse2="set_value",100
```

- Enter the command to set the count of counter pulses in case you do not want to start from 0. In this case, 100 will be set. The available range is 0 – 4294967295.

```
at^scpulse2="stimer",60
```

- Enter the command to define the intervals in seconds for storing the counter value in the EEPROM. The available range is 5 – 10000s.

```
at^scpulse2="start"
```

- Enter the command to enable pulse counting on input 2.

```
at^scpulse2="stop"
```

- Enter the command to disable pulse counting on input 2.

```
at^scpulse2="clear"
```

- Enter the command to clear the input 2 counter.

```
at^scpulse2="save"
```

- Enter the command to store the counter value in the EEPROM manually.

```
at^scpulse2?
```

- Enter the command to display the current interface settings.

```
at^scpulse2=?
```

- Enter the command to display the setting options for the interface.

General Commands

General commands for **2N® SmartCOM**.

```
at
```

- A terminal function control command, which executes no action and always gets the OK answer.

```
ate
```

- Enter the command to disable echo (replies are displayed only instead of commands).

```
ate0
```

- Enter the command to disable echo.

```
ate1
```

- Enter the command to enable echo.

```
at+cgmi
```

- Enter the command to display the **2N® SmartCOM** manufacturer – **2N® Telekomunikace a.s.**

```
at+cgmm
```

- Enter the command to display the model - **2N® SmartCOM**.

```
at+cgmr
```

- Enter the command to display the current firmware version - SC_vxx.xx.

```
at+cgsn
```

- Enter the command to display the GSM module IMEI.

```
at+cimi
```

- Enter the command to display the SIM card IMSI.

```
at+gmi
```

- Enter the command to display the **2N® SmartCOM** manufacturer – **2N® Telekomunikace a.s.**

```
at+gmm
```

- Enter the command to display the model - **2N® SmartCOM**.

```
at+gmr
```

- Enter the command to display the current firmware version - SC_vxx.xx.

```
at+gsn
```

- Enter the command to display the GSM module IMEI.

```
ati
```

- Enter the command to display the model - **2N® SmartCOM**.

```
ati3
```

- Enter the command to display the current firmware version - SC_vxx.xx.

```
ati4
```

- Enter the command to display the **2N® SmartCOM** serial number.

```
ato
```

- Enter the command to switch the port from the command mode to the transparent mode.

```
ata
```

- Enter the command to switch the port from the command mode to the transparent mode during an incoming TCP connection ringing.

```
ath
```

- Enter the command to terminate (reject) an incoming TCP connection ringing.

```
ats0?
```

- Enter the command to display the automatic answering of incoming calls.
  - 0 - means that incoming calls will be ignored and should be answered manually using the ata command.
  - Digit – count of rings after which the incoming call is answered automatically.

```
ats0=5
```

- Enter the command to set the count of rings before automatic answering to 5. The port is automatically switched into the transparent modes after an incoming RING.

```
at^sc232at=1
```

- Enter the command to set the AT mode upon power up.
  - 0 - disabled. The port will be in the DATA mode upon power up.
  - 1 - enabled. The port will be in the CMD mode upon power up.

```
at^sc232at?
```

- Enter the command to display the automatic AT mode setting state.

```
at^sc232at=?
```

- Enter the command to to display the automatic AT mode setting options.

```
at^sccfgall?
```

- Enter the command to display the currently set values for all interfaces.

```
^SCCFG: "MODE","TCPCLIENT"
^SCCFG: "GPRS_APN","internet.t-mobile.cz"
^SCCFG: "GPRS_USER","internet"
^SCCFG: "GPRS_PASS","internet"
^SCCFG: "LOCAL_IP","85.44.9.234"
^SCCFG: "SERVER_IP","90.182.12.134"
^SCCFG: "SERVER_PORT",1620
^SCCFG: "AUTH_PASS","hjwej549f"
^SCCFG: "SIM_PIN","2494"
^SCCFG: "AUTH_IP",0
^SCPORT1: "BAUDRATE",115200
^SCPORT1: "DATA_BITS",8
^SCPORT1: "STOP_BITS",1
^SCPORT1: "PARITY",0
^SCPORT1: "FLOWCONTROL",0
^SCPORT2: "BAUDRATE",115200
^SCPORT2: "DATA_BITS",8
^SCPORT2: "STOP_BITS",1
^SCPORT2: "PARITY",0
```

Access Authorisation According to IP Addresses

These commands are used for setting 5 IP addresses authorised for access to this terminal. Connections coming from other IP addresses will be ignored.

```
at^sccfg="auth_ip",1
```

- Switch on / off access authorisation according to IP addresses.

```
at^scipauth="add","54.182.153.21"
```

- Enter the command to add an IP address to the list end. When the maximum count of addresses in the list is reached, the command will be rejected.

```
at^scipauth="remove",1-5
```

- Enter the command to remove an IP address from the list. Select the position using parameters 1 to 5.

```
at^scipauth="clear"
```

- Enter the command to delete all IP addresses from the list.

```
at^scipauth?
```

- Enter the command to write out the list of set IP addresses.

```
SCIPAUTH: 1> "90.182.112.54"
SCIPAUTH: 2> "90.182.112.5"
```

```
at^scipauth=?
```

- Enter the command to display the setting options for the interface.

```
SCIPAUTH: "ADD","15"
SCIPAUTH: "REMOVE",1-5
SCIPAUTH: "CLEAR"
```

Test Command

This command is used for terminal testing. Enter this command to monitor the terminal state for provider's or **2N® SmartCOM** Server connection troubleshooting purposes, for example.

```
at^sctest
```

- Enter the command to test the basic functions of the terminal: GSM module login to the provider's network, GPRS data connection operability and **2N® SmartCOM** Server connection, for example. You will get the following reply, for example:
  - at^sctest
  - OK
  - Entering the test mode
  - GSM state: GPRS running
  - -testing GSM module: running
  - -testing MUX running: OK
  - -testing MUX command: OK
  - -testing SIM presence: OK
  - -checking SIM state: SIM ready
  - -checking GSM registration: local network
  - -testing signal strength: -65dBm (STRONG)
  - -reading operator name: "T-Mobile CZ"
  - -reading local address: "10.168.174.3"
  - SmartCOM mode: "TCPCLIENT"

- SmartCOM state: Client authenticated
- Leaving the test mode
- OK

Caution

- When you have sent the command to **2N® SmartCOM**, the data channel serving the peer on TCP port 10002 will be closed. It is because this channel is used for GSM module communication during command execution. When the command has been executed, the original channel setup is restored and a new incoming connection is awaited.

Other Commands – Boot, State, Service, Others

These commands are used for firmware upgrade and servicing of the GSM module.

```
at^scupg="http://star.2n.cz/~fejfar/SmartCOM_SC_v00-04.bin"
```

- The command is used for firmware upgrade. It includes the address of the server where it is located and the version to be downloaded.

```
at^screstart
```

- The command is used for terminal restart.

```
at^scfres
```

- This command makes the factory reset of the **2N® SmartCOM** unit connected.

```
at^sc232lock=0-1
```

- Enter the command to enable RS-232 authentication, i.e. password authorisation for connection. 0 = disabled, 1 = enabled.

```
at^sc232lock?
```

- Enter the command to display the current RS-232 lock setting state.

```
at^sc232lock=?
```

- Enter the command to display the RS-232 lock setting options.

```
at+csq
```

- Enter the command to display the signal intensity.
  - +CSQ: 99,99

```
at^scop?
```

- Enter the command to display the GSM provider to which **2N® SmartCOM** is currently logged in.

```
at^scms?
```

- This command specifies the GSM module.
  - WISMO228
  - WAVECOM MODEM
  - L23_00gg.WISMO228 140711

```
at^iccid?
```

- Enter the command to display the SIM ICCI (Integrated Circuit Card IDentifier).

```
at^scpras?
```

- Enter the command to display the remaining PIN entering attempts.

```
at^sig?
```

- Enter the command to display signal intensity in dBm.
  - ^SIG: -65dBm (STRONG)

```
at^scerr?
```

- Enter the command to write out the error buffer status.

```
^SCERR: 72> 8,10
^SCERR: 73> 8,10
```

```
at^scerrclear
```

- Enter the command to delete the error buffer contents.

Charger (for 2N® SmartCOM PRO Only)

These commands are implemented in the charger-containing **2N® SmartCOM PRO** ve rsion only.

```
at^scchg="max_voltage",6800
```

- Enter the command to set the maximum accumulator voltage in mV.

```
at^scchg="max_current",350
```

- Enter the command to set maximum charging current in mA.

```
at^scchg="state"
```

- Enter the command to know the current charging state.
  - ACTIVE- charging activated.
  - STOPPED- charging stopped.

```
at^scchg="start"
```

- Enter the command to enable the charging function.

```
at^scchg="stop"
```

- Enter the command to disable the charging function.

```
at^scchg="save"
```

- Enter the command to save the currently made changes.

```
at^scchg="srestart"
```

- Enter the command to save the changes and modify the charging parameters immediately.

```
at^scchg?
```

- Enter the command to display the current charger settings and charging state.

```
at^scchg=?
```

- Enter the command to display the charger setting options.

Warning

- Remember to set the charger parameters before connecting the accumulator and starting the charging process. Make sure that the settings are in compliance with the accumulator manufacturer's catalogue values to avoid accumulator damage, fire or explosion.

Caution

- Use a 6V or 12V gel-lead-acid accumulator only for charging. Make sure that the charging voltage is at least 1V higher than the maximum voltage of the accumulator connected.

Real Time Clock (for 2N® SmartCOM PRO Only)

These commands are implemented in the real time clock containing **2N® SmartCOM PRO** version only.

```
at^scclk="RR/MM/DD,hh:mm:ss+ZZzz"
```

- Enter the command to set the real time clock. The ZZzz parameter means a time zone, denoting ZZ hours and zz minutes shift against the GMT.

```
at^scclk?
```

- Enter the command to display the current time in the following format:

^SCCLK: "12/04/19,16:00:25+0200"
(April 19, 2012, 16:00:25, time zone: 2 hours from GMT)

Wireless M-Bus (for 2N® SmartCOM PRO Only)

These commands are implemented in the **2N® SmartCOM PRO** version only, which contains an optional Wireless M-Bus module.

```
at^scwmbus="dev_add","MAN",12345678<,600>
```

- Enter the command to add an item to a table of meters to be read. 'MAN' is a three-character abbreviation for the manufacturer, followed by the meter serial number. The last parameter denotes the minimum time interval in seconds between two stored readings of the meter to be added. If the last parameter is not entered, all messages received from the meter are stored.

```
at^scwmbus="decrypt",1
```

- Enter the command to enable decryption of messages captured on the module. Setting options: 0 - 1.

```
at^scwmbus="key_add",1,A5B95C144134DE257AF2ED4F384C7EB7
```

- Enter the command to set the encryption key for meter 1.

```
at^scwmbus="dev_remove",1
```

- Enter the command to remove an item from the meter table; the parameter sets the meter position in the table.

```
at^scwmbus="dev_clear"
```

- Enter the command to clear the whole meter table.

```
at^scwmbus="get_oldest"
```

- Enter the command to write out the oldest record from the Wireless M-Bus meter data space. Example of a reply:

```
^SCDATA: "WMBUS",,,,,""
```

Meaning of parameters:

- timestamp – record receiving time (UNIX timestamp)
- id – record code in circular buffer
- rssi – signal strength in dBM during message receiving
- len – received message length in bytes

Tip

- You can find different message formats is earlier FW versions: ^SCWMBUS: <timestamp>,<id>,<rssi>,<len>,"<binary data in hexadecimal format>"
- There is a difference in data contents in this message: three information bytes on the Radiocrafts module are added to the end.

```
at^scwmbus="get_oldest"<,n>
```

- Enter the command to enable mass read-out of the messages. The optional n parameter defines how many messages are to be read out.

```
at^scwmbus="del_oldest"
```

- Enter the command to delete the oldest record from the Wireless M-Bus meter data space. Delete the oldest record and enter the 'get_oldest' command to read the oldest but one record.

```
at^scwmbus="del_oldest"<,n>
```

- Enter the command to enable mass deletion of the messages. The optional n parameter defines how many messages are to be deleted.

```
at^scwmbus="del_all"
```

- Enter the command to delete all records from the Wireless M-Bus meter data space.

```
at^scwmbus="mode",11
```

- Enter the command to set the device operating mode.
  - 1 - T1
  - 3- S1
  - 8- C1
  - 11- T1+C
  - 17 - N1

Note

- The 17 - N1 mode is available only if the terminal is equipped with a WMbus module, which supports the mode.

```
at^scwmbus="get_space"
```

- Enter the command to display free memory space for WM-bus message storing.

```
at^scwmbus="mess_cnt"
```

- Enter the command to display the count of WM-bus messages received.

```
at^scwmbus="RF_channel",1
```

- Enter the command to define the WMbus transmission channel. Setting options: 1 - 10.

  1. 169.406250 MHz (Channel 1a)
  2. 169.418750 MHz (Channel 1b)
  3. 169.431250 MHz (Channel 2a)
  4. 169.443750 MHz (Channel 2b)
  5. 169.256250 MHz (Channel 3a)
  6. 169.458750 MHz (Channel 3b)
  7. 169.437500 MHz (Channel g)
  8. 169.412500 MHz (Channel 1)
  9. 169.437500 MHz (Channel 2)
  10. 169.462500 MHz (Channel 3)

```
at^scwmbus="preamble_len",0
```

- Enter the command to define the frame format. 0 means 4 (short) / Frame format A. 1 - 70 (long) / Frame format A.

```
at^scwmbus="Install_mode",0
```

- Enter the command to switch the normal and filter off options. In the normal mode, data are received from the defined modules only and the other modules are ignored. In the filter off mode, the module receives and saves all data from all modules.
  Setting options: 0 - normal, 1 - filter off.

```
at^scwmbus="restart"
```

- Enter the command to restart the WMbus module.

```
at^scwmbus="sniff"
```

- Enter the command to enable the 'sniff' mode to make the WMbus module capture and display all messages from the devices in the vicinity. After the command is entered, the connect message gets displayed and the terminal starts writing out the messages. Press Enter to quit. The disconnect message will be displayed for confirmation.

```
at^scwmbus="module_type"
```

- Enter the command to display information on the WMbus module. Response example: ^SCWMBUS: "MODULE_TYPE","RC1180-MBUS3,2.00,3.14"

```
at^scwmbus?
```

- Enter the command to display the currently set Ethernet parameters.

```
at^scwmbus=?
```

- Enter the command to display the Wireless M-Bus setting options.

Ethernet (for 2N® SmartCOM PRO ETH Only)

These commands are implemented in the Ethernet containing **2N® SmartCOM PRO** E TH version only.

```
at^sceth="ip_method","DHCP"
```

- Enter the command to set the method of IP address setting:
  - DHCP – automatic IP address setting from DHCP server.
  - FIXED – manual IP address setting.

```
at^sceth="local_ip"
```

- Enter the command to return the current IP address used on the Ethernet port.

```
at^sceth="fixed_ip","192.168.1.1"
```

- Manual IP address setting.

```
at^sceth="mask","255.255.255.0"
```

- Manual network mask setting.

```
at^sceth="gateway","192.168.1.254"
```

- Manual default gateway setting.

```
at^sceth="dns1","0.0.0.0"
```

- Manual primary DNS setting.

```
at^sceth="dns2","0.0.0.0"
```

- Manual secondary DNS setting.

```
at^sceth="save"
```

- Enter the command to save changes.

```
at^sceth="restart"
```

- Enter the command to restart the Ethernet port.

```
at^sceth="srestart"
```

- Enter the command to save the changes and restart the Ethernet port.

```
at^sceth?
```

- Enter the command to display the currently set Ethernet parameters.

```
^SCETH: "IP_METHOD","FIXED"
^SCETH: "LOCAL_IP","192.168.1.1"
^SCETH: "FIXED_IP","192.168.1.1"
^SCETH: "MASK","255.255.255.0"
^SCETH: "GATEWAY","192.168.1.254"
^SCETH: "DNS1","192.168.1.1"
^SCETH: "DNS2","0.0.0.0"
```

```
at^sceth=?
```

- Enter the command to display the Ethernet setting options.

```
^SCETH: "IP_METHOD","FIXED"|"DHCP"
^SCETH: "LOCAL_IP"
^SCETH: "FIXED_IP","7-15"
^SCETH: "MASK","7-15"
^SCETH: "GATEWAY","7-15"
^SCETH: "DNS1","7-15"
^SCETH: "DNS2","7-15"
^SCETH: "SAVE"
^SCETH: "RESTART"
^SCETH: "SRESTART"
```

```
at^scchprim="GSM"
```

- Enter the command to set the primary channel to be used for creating IP connections.
  - GSM – connections will be created via GPRS.
  - ETH – connections will be created via Ethernet.

```
at^scchprim?
```

- Enter the command to display the currently set primary channel.

```
at^scchled1="GSM"
```

- Enter the command to set the LED function.
  - GSM – LED shows the state of GPRS connection.
  - ETH – LED shows the state of the Ethernet interface.

```
at^scchled1?
```

- Enter the command to display the currently set LED function.

SC Ping

These commands are available in the **2N® SmartCOM** and **2N® SmartCOM PRO** vers ions only. Enter the commands to set periodical pinging to the set address in defined intervals. Use SC Ping to ensure the correct function of NFG syntax in UDF or keep firewall connection if the terminal is in the STANDALONE mode.

```
at^scping="host","8.8.8.8"
```

- Enter the command to set the Host IP address to which the ICMP request shall be sent.

```
at^scping="interval",5
```

- Enter the interval in minutes. 0 means that periodical pings are deactivated.

```
at^scping="test"
```

- Enter the 'test' command to test configuration before saving. The currently changed value is always saved and thus no restart is needed during setting and functionality check.

```
at^scping="save"
```

- Enter the command to save the changes.

```
at^scping="restart"
```

- Enter the command to restart the function.

```
at^scping="srestart"
```

- Enter the command to save the changes and reset the ping parameters immediately.

```
at^scping?
```

- Enter the command to display the current interface values.
  - SCPING: "HOST","8.8.8.8"
  - SCPING: "INTERVAL",0

```
at^scping=?
```

- Enter the command to display the interface setting options.

```
SCPING: "HOST","1-32"
SCPING: "INTERVAL",0-65534
SCPING: "TEST"
SCPING: "SAVE"
SCPING: "RESTART"
SCPING: "SRESTART"
```

ZigBee (for 2N® SmartCOM PRO Only)

These commands are available in the **2N® SmartCOM PRO** and **2N® SmartCOM PRO ETH** versions only, which are equipped with an optional ZigBee module. You can define up to 16 devices to be saved in the database and communicated with.

```
at^sczb="add",<16 HEX>
```

- Enter the command to add a device to the table. "<16 HEX>" is a 16-character IEEE address. Contact your meter manufacturer for these parameters.

Tip

- The IEEE ZigBee addresses have the following format: **00:15: bc:00:1d:00:0e:c5**. The AT command for adding a device with the selected address is as follows:

```
at^sczb="add",0015bc001d000ec5
```

- The command adds the device to the first vacant place in the table.

```
at^sczb="del",<dev_id>
```

- Enter the command to remove a device from the table. Setting options: 1 - 16.

```
at^sczb="onoff_get",<dev_id>
```

- Enter the command to write out the state of the relay with the selected ID.

```
at^sczb="onoff_set",<dev_id>,<state>
```

- Enter the command to set the selected relay state for the device with the selected ID. 'dev_id' specifies the meter position in the table and 'state' (0/1) defines the relay state (OFF/ON).

```
at^sczb="metering_getactive"
```

- Enter the command to read out the current immediate consumption from the meter with the selected ID.

```
at^sczb="metering_getsumt"
```

- Enter the command to read out the current total consumption from the meter with the selected ID.

```
at^sczb="module_type"
```

- Enter the command to display information on the ZigBee module. Response example: ^SCZB: "MODULE_TYPE","RC2400,2.01,"

```
at^sczb=?
```

- Enter the command to display the command parameters.

```
^SCZB: "ADD",<16 HEX>
^SCZB: "DEL",1-16
^SCZB: "ONOFF_SET",1-16,0-1
^SCZB: "ONOFF_GET",1-16
^SCZB: "METERING_GETACTIVE",1-16
^SCZB: "METERING_GETSUM",1-16
```

```
at^sczb?
```

- Enter the command to display the list of devices including their attributes, states and options; see below.

```
^SCZB: ID, STATE, IEEE ADDR, CAP ONOFF, CAP METERING, ONOFF GET, METERING
ACTIVE, METERING SUM, SIGNAL
^SCZB: 1, RUNNING, 00:15:bc:00:17:00:12:27, TRUE, TRUE, 1, 340W, 3 kWh, 17%
^SCZB: 2, RUNNING, 00:15:bc:00:1d:00:0e:c5, TRUE, TRUE, 1, 0 W, 0 kWh, 0%
^SCZB: 3, RUNNING, 00:15:bc:00:1d:00:06:ed, TRUE, TRUE, 1, 0 W, 0 kWh, 0%
^SCZB: 4, SLOT FREE, 00:00:00:00:00:00:00:00, FALSE, FALSE, 0, 0 W, 0 kWh, 0%
^SCZB: 5, SLOT FREE, 00:00:00:00:00:00:00:00, FALSE, FALSE, 0, 0 W, 0 kWh, 0%
^SCZB: 6, SLOT FREE, 00:00:00:00:00:00:00:00, FALSE, FALSE, 0, 0 W, 0 kWh, 0%
...
^SCZB: 15, SLOT FREE, 00:00:00:00:00:00:00:00, FALSE, FALSE, 0, 0 W, 0 kWh, 0%
^SCZB: 16, SLOT FREE, 00:00:00:00:00:00:00:00, FALSE, FALSE, 0, 0 W, 0 kWh, 0%
```

5. Configuration by SMS

The SMS described in this section are used for basic settings of the terminal. You have to know the telephone number of the SIM card inserted in your **2N® SmartCOM** to ensure a reliable function.

Caution

- Every SMS sent to **2N® SmartCOM** must meet all of the conditions mentioned below. Otherwise, the SMS will be ignored, no changes will be made and an error message will be sent to the SMS–sending number.

Function Desription

You can configure **2N® SmartCOM** by sending short text messages to the telephone number of the SIM card inserted in the terminal. Doing this, respect the below listed parameters to avoid an SMS processing error.

Every configuration SMS must meet the following conditions:

- **Name of device – 'SC'**
- **Correctly formatted command (INFO, CNF, etc.)**
- **Authorisation password**
- **Correctly defined parameters (refer to the command parameters)**
- **Upper/Lower Case must be respected**
- **Parameters must be separated with a space**
- **7–bit SMS format (no diacritic symbols)**
- **Maximum length of 160 characters (which is one SMS, concatenated SMS are not supported)**

Note

- **The maximum SMS length is 160 characters.** This is a GSM standard, which allows 1120 bits, i.e. 140 bytes, per SMS. Since 7–bit encoding is used by default, 20 characters are saved per 140 bytes and so the resultant length is 160 characters. The GSM 03.38 character set is applied. UCS–2 16–bit encoding is used for the characters that are not included in the ASCII standard (characters with diacritics). In that case, the SMS contains only 70 characters.
  Not supporting the UCS–2 character set, 2N® SmartCOM cannot process such SMS correctly and marks them as errors.
- Modern GSM devices support SMS concatenating where several standard SMS are merged into a long one. Information on each fragment of the long SMS is written into the User Data Header (UDH) and so no fragment may be longer than 153 chars in 7–bit encoding.
  Not supporting the UDH encoding system, 2N® SmartCOM cannot process such SMS correctly and marks them as errors.

INFO SMS

Send the following message to identify the provider, IMSI, IMEI or serial number of your **2N® SmartCOM**:

```
SC INFO PWD=<password>
```

Caution

- Remember to enter the correct password into the SMS to avoid SMS ignoring as a SPAM.

The reply to such SMS can, for example, look as follows:

```
SIG=-71dBm OPER=T-Mobile CZ IMSI=230015001155344 IMEI=355915030750962
SN=50-0369-0080 LIP=89.24.0.141 FW=1.2.0.2.4 STAT=CONNECTED
```

Caution

- The reply format depends on the current terminal mode.

The reply for the TCP and UDP client modes is as follows:

```
SIG=<signal_level> OPER=<operator> IMSI=<sim_card_imsi>IMEI=<module_imei>
SN=<terminal_serial_number> LIP=<local_ip>FW=<terminal_fw_version>
STAT=<current_terminal_status>
```

The reply for the STANDALONE mode is as follows:

```
SIG=<signal_level> OPER=<operator> IMSI=<sim_card_imsi><br>IMEI=<module_imei>
SN=<terminal_serial_number> LIP=<local_ip>FW=<terminal_fw_version>
STAT=LISTENING <num_of_connected_clients>
```

The meanings of the parameters in the reply SMS are as follows:

- **<password> –** authentication password; the password has to be set up first (AUTH_PASS configuration parameter).
- **<signal_level> –** current signal level in the '–XXXdBm' format.
- **<operator> –** provider's name in the long format (name, no number).
- **<sim_card_imsi> –** IMSI of the SIM card inserted.
- **<module_imei> –** IMEI of the GSM module used.
- **<terminal_serial–number> –** serial number in the 'xx–xxxx–xxxx' format.
- **<local_ip> –** local address of the terminal (assigned by the provider).
- **<terminal_fw_version> –** terminal firmware version.
- **<current_terminal_status> –**current terminal status (in the Client mode only).
  - **CONNECTING** – terminal connection to **2N® SmartCOM** Server in progress.
  - **CONNECTED** – terminal connection to **2N® SmartCOM** Server completed.
- **<num_of_connected_clients> –** count of clients currently connected to all ports (in the STANDALONE mode only).

Basic Settings

The following configuration SMS sets the basic parameters necessary for a proper function of the terminal, including connection to the GSM provider and **2N® SmartCOM** Server, **2N® SmartCOM** mode switching and RS 232 authorisation enable.

Use the following command to know the current parameters settings:

```
SC CNF PWD=<password>
```

The reply to such SMS can, for example, look as follows:

```
MODE=1 232LCK=0 APN=publicip.t–mobile.cz DUSR= DPWD= IPS=90.182.112.51
PORTS=1620
```

Tip

- You can send all the parameters at once or enter only those you want to change in the configuration. Hence, you need not always send all optional parameters but have to meet the basic conditions mentioned in the Function Description above.

Now let us describe the contents of a configuration SMS and all optional parameters.

```
SC CNF PWD=<password> [MODE=<mode>] [232LCK=<rs232_lock>] [APN=<gprs_apn>]
[DUSR=<gprs_data_user>] [DPWD=<gprs_data_password>] [IPS=<server_ip_address>]
[PORTS=<server_port>] [NPWD=<new_password>]
```

The parameters in square brackets are optional and can be omitted. The password is the only mandatory parameter! The meanings of the CNF command parameters are as follows:

- **PWD=<password> –** authentication password. The password has to be set up first (AUTH_PASS configuration parameter). The password is the only **mandatory** parameter in this configuration SMS!
- **MODE=<mode> –**this parameter changes the mode and has the following numerical options:
  - **1 –** TCP Client
  - **2 –** UDP Client
  - **3 –** STANDALONE
- **232LCK=<rs232_lock> –** this parameter enforces authorisation on the RS232 port. If enabled, you have to authorise yourself by the password to get connected via this port. 0 = disabled, 1 = enabled.
- **APN=<gprs_apn> –** provider's Access Point Name.
- **DUSR=<gprs_data_user> –** user name for provider connection.
- **DPWD=<gprs_data_password> –** password for provider connection.
- **IPS=<server_ip_address> –2N® SmartCOM** Server IP address (used in the Client mode).
- **PORTS=<server_port> –** listening server port for terminal connection (used in the Client mode).
- **NPWD=<new_password> –** new authorisation password.

Tip

- The new authorisation password should contain 5 characters at least to prevent communication problems with other applications.

Tip

- If the SMS has been created and processed correctly, **2N® SmartCOM** will send a confirmation SMS to the number from which the original SMS was sent. The confirmation SMS contains all the recently set parameters and is used for verification of the set values.

Caution

- Some GSM providers do not require user name and password for Internet connection setup. Therefore, contact your provider to make sure.

Example of configuration SMS:

Suppose you want to change the default password (into password 1) and set APN

to 'internet.open'. Also, set the server IP address to 90.89.126.3 and the listening port to 1658. This is the most frequent way of setting.

Thus, send the following configuration SMS:

```
SC CNF PWD=APNpassword=internet.open IPS=90.89.126.3 PORTS=1658 NPWD=password1
```

The following reply will come from the terminal after processing:

```
MODE=1 232LCK=0 APN=internet.open DUSR= DPWD= IPS=90.89.126.3 PORTS=1658
```

Send the following SMS:Error Buffer

An error buffer is implemented in each terminal to store data on terminal operation errors. To display the buffer contents use either the terminal (an AT command) or an SMS. The SMS displays the last 10 errors starting with the most recent one.

```
SC ERR PWD=<password> [CLR]
```

- **CLR –** clear the error buffer.

Tip

- This command includes one optional parameter – **CLR.** If you add this string after the password in the command SMS, you will receive an SMS showing the current buffer contents and all errors will then be deleted from the terminal memory.

The following reply will come from the terminal after processing:

```
1:8,10 2:3,10 1:1,0 7:8,10 6:8,7 5:7,40 4:11,848
```

The following reply will come if there is no error in the error buffer:

```
NO ERROR
```

Note

- Refer to SC_errors.doc for the meanings of the error codes!

Relay Control

Every terminal is equipped with two relay outputs, which can be SMS controlled. The configuration SMS must include the password and one of the four programmable parameters at least.
The programmable parameters include:

- **R1** or **R2**– define the relay state:

- **1 –** relay is closed (on)
  0 – relay is open (off)
- **S1** or **S2 –**define the relay state after the terminal restart:
  - **1 –** relay is closed after restart
  - **0 –** relay is open after restart
  - **2 –** relay retains the pre–restart state

Tip

- The relay gets off (contacts get released) after power off and, normally, the terminal does not remember the relay states. Therefore, the S1 and S2 parameters have been introduced, defining to which state the relay should be switched after power up.

Example:

Suppose you want relay 1 to be switched into the open state now and into the closed state after restart, and relay 2 to close and retain so after restart. Hence, send the following configuration SMS:

```
SC REL PWD=Password R1=0 R2=1 S1=1 S2=2
```

The command will be executed and the terminal will send the following reply:

```
R1=0 R2=1 S1=1 S2=2
```

IP Access

You can also set IP address access authorisation using SMS. By enabling the IP Access you will restrict the access to the terminal configuration to selected IP addresses. You can select up to 5 different IP addresses.

The configuration SMS is as follows:

```
SC IPA PWD=<Password> [AUTH=<ip_auth>] [ADD=<ip_addr>] [DEL=<ip_id>]
_[REP=<ip_addr_1>,<ip_addr_2>,…<ip_addr_5>]
```

Now let us describe the contents of the configuration SMS and all optional parameters.

The parameters in square brackets are optional and can be omitted. The password is the only mandatory parameter! The meanings of the IPA command parameters are as follows:

- **PWD=<password> –** authentication password. The password has to be set up first (AUTH_PASS configuration parameter). The password is the only **mandatory** parameter in this configuration SMS**!**
- **AUTH=<ip_auth> –**this parameter changes the mode and has the following numerical options:
  - **0 –** disabled
  - **1 –** enabled

- **ADD=<ip_addr> –** add a selected IP address to the list end.

> **Caution**
> - Enter the IP address in the numerical format only ranging from 0.0.0.0 to 255.255.255.255.

- **DEL=<ip_id> –** delete the IP address on the selected list position.

> **Caution**
> - Select **0** in the ip_id parameter to delete all the IP addresses from the list. The SMS will be as follows: **SC IPA PWD=password DEL=0**.

- **REP=<ip_addr_1>, <ip_addr_2>,…<ip_addr_5> –** replace the existing address list with a new one.

Example:

Suppose you want to know whether the IP access function is enabled. Send the following SMS:

```
SC IPA PWD=<password>
```

The reply can, for example, look as follows:

```
AUTH=1 1:90.156.29.195 2:109.54.2.234
```

Now disable the IP access and delete all IP addresses from the list using the following SMS:

```
SC IPA PWD= AUTHpassword=0 DEL=0
```

The following reply will come from the terminal:

```
AUTH=0 NO IP
```

> **Tip**
> - **NO IP** means that there is no IP address in the address list.

Error Replies

Having noticed an error in the configuration SMS or command processing, **2N® SmartCOM** will send you an error reply. **If the terminal generated an error reply, it means that the command was not executed!**

> **Tip**
> - **2N® SmartCOM** sends error replies until all the configuration SMS parameters are OK and the command is executed.

The following errors can occur:

- **ERR Unknown command –** an unknown command has been entered. Four commands are allowed (INFO, CNF, ERR, REL, IPA).
- **ERR Password missing –** the configuration SMS fails to include the password, i.e. the PWD='password' string.
- **ERR Password incorrect –** the password is wrong.
- **ERR Too many parameters –** the configuration SMS contains more than 160 characters or was sent as a 16–bit message (with diacritic symbols and/or substandard characters).
- **ERR Unknown parameter –** an unknown parameter has been entered. Refer to the commands for all allowed parameters.
- **ERR Parameter value incorrect –** the parameter value is incorrect.

6. Terminal Config

The Terminal Config application is used for basic configuration of the terminal. This subsection provides details on its environment and basic functions. Launch the application from the directory into which you installed it.

Note

- The **2N® SmartCOM Terminal Configuration Program** installation requires **20 MB** of free disk space at least.

Application Details

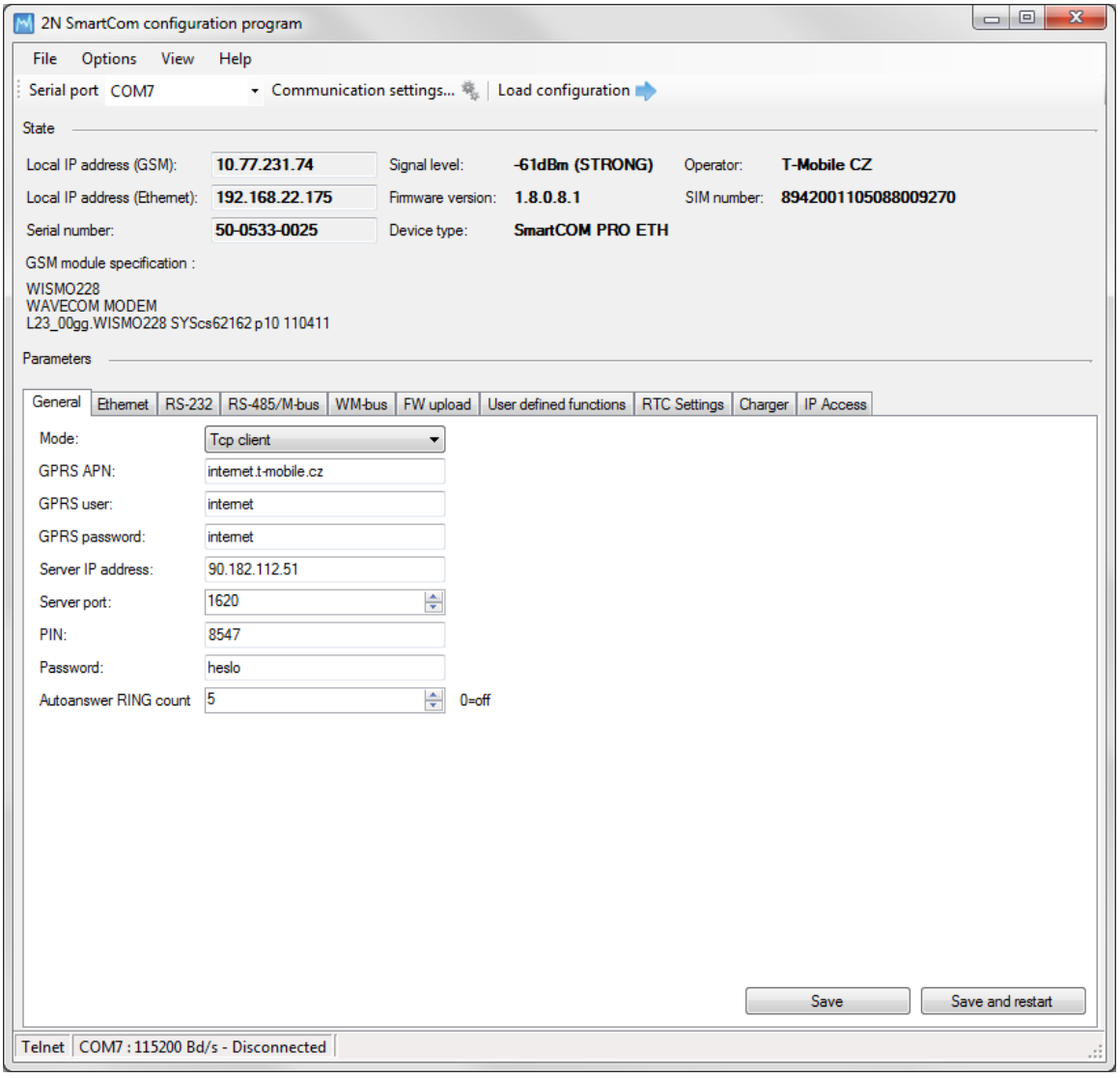


Figure: Terminal Config Window

The figure above shows the **2N® SmartCOM** Terminal Configuration Program (hereinafter referred to as Terminal Config) window. The main toolbar helps you select the **Serial port** for connection to **2N® SmartCOM** (hereinafter referred to as terminal). This list includes all available serial ports installed in the PC on which the application is running.

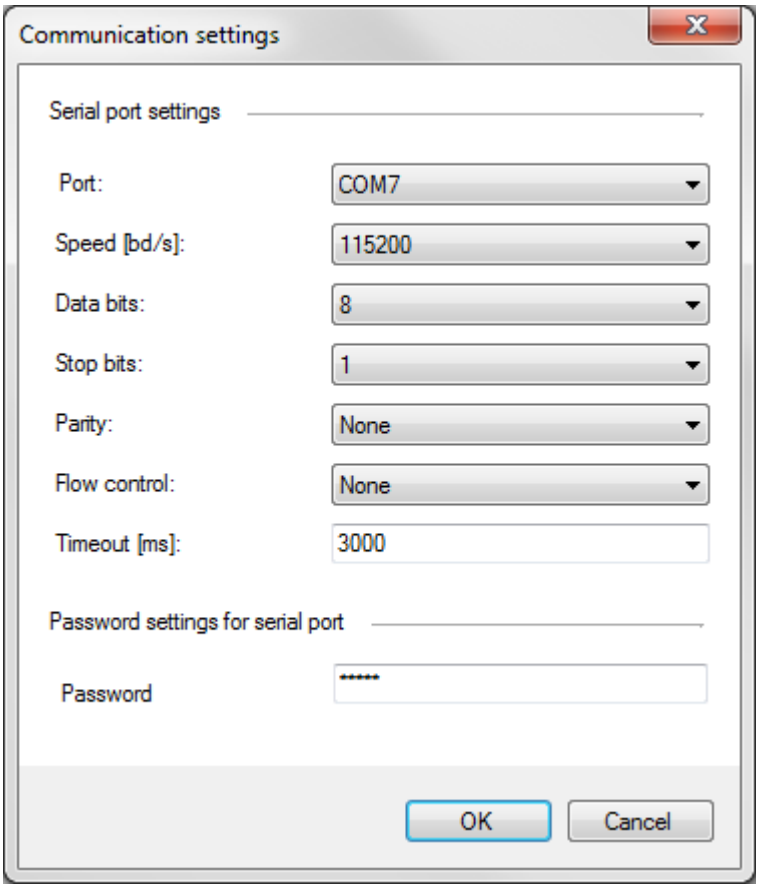


Figure: Communication Settings

Having selected a port, set the communication parameters to adjust communication rates and signal transmission parameters for the serial port. The **2N® SmartCOM** factory values are set here by default. Refer to the **Communication Settings** figure above.
No password is requested by default for the RS-232 port and so nothing has to be filled in. Passwords may be different for different terminals. If a password is requested, enter the password into the dialogue window displayed during the connecting process. The last main toolbar button helps you **Load configuration** from the terminal connected - the application gets connected and reads out all relevant data.

Tip

- The application connects to the selected terminal, identifies the RS-232 mode (DATA or COMMAND), switches the port as necessary, reads out the data, switches the port into the original mode and terminates communication. This gives the other users continuous access to the terminal.

The **State** section displays the most important information on the given device.

The IP address, serial number, firmware version, logged-in provider and signal level are displayed. The SIM ICCID (Integrated Circuit Card ID) is displayed, which is not the

SIM telephone number, i.e. MSISDN, but a unique SIM serial number. There are no two identical ICCIDs at one moment. These 19-digit numbers start with 8942 for the Czech Republic.

Moreover, the section provides information on the GSM module: type, manufacturer and firmware version.

The **Parameters** section helps you view and set parameters for the **2N® SmartCOM** t erminals. Refer to Subs. 6.1 for application use details.
Use the **File** menu to read configuration, import/export configuration or reset the connected terminal. Via the **Options** menu you can adjust communication parameters and/or change the default language (CZ or EN). The **View** section helps you disable the tags that are not frequently used and occupy too much space. Open the View menu and specify the tag(s) to be seen.

Tip

- The **General** tag is always visible. It is the only menu that cannot be disabled.

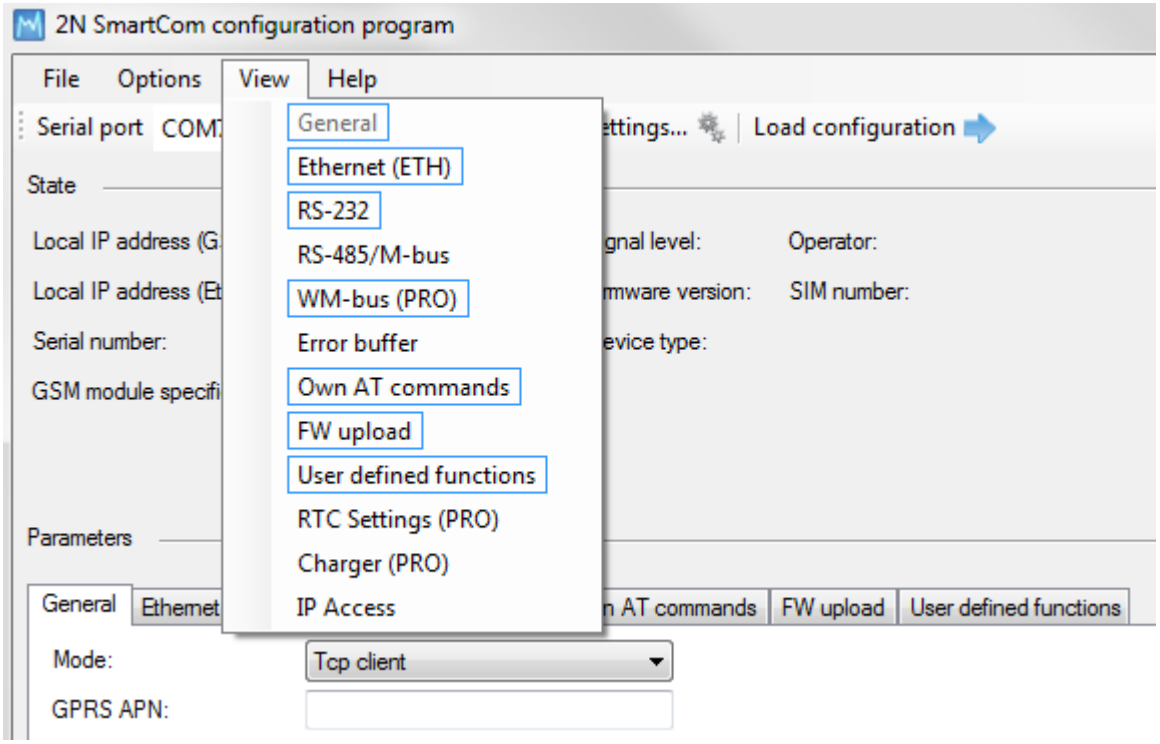


Figure: View Menu

Go to **Help** to know details on the Terminal Config manufacturer and version.

Application Use

Tip

Not all tags are accessible to all device models.

- **General, RS-232, RS-485/M-Bus, Error buffer, Own AT commands, FW upload, User defined functions** and **IP access** are accessible to all terminals.
- **WM-Bus, RTC settings** and **Charger** are available to the **SC PRO** and **SC PRO ETH** terminals only.
- **Ethernet** is accessible to the **SC PRO ETH** terminals only.

Having read configuration, go to the **General** tag of the **Parameters** section.

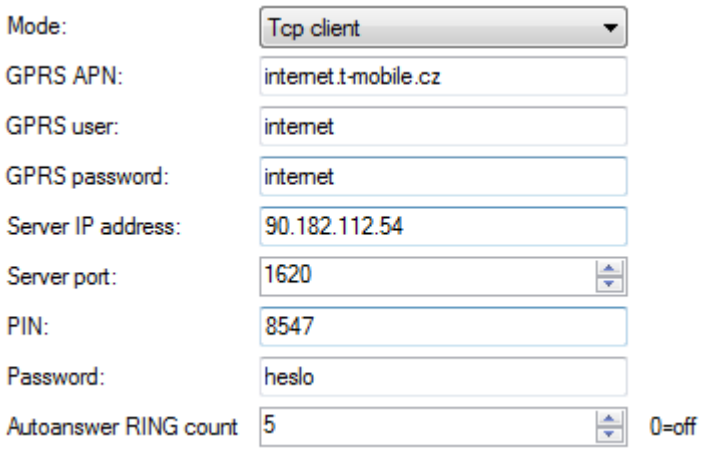


Figure: General Menu

Here you can set all parameters comfortably as you can with the AT commands described in S. 4, i.e. GSM commands plus automatic answer parameters. Push **Save** t o save the values. Push **Save and restart** to apply the changes immediately.

The Ethernet menu is only available to terminals equipped with an Ethernet port. Set the primary data flow channel, LED signalling functions, obtaining IP address from the DHCP server or static obtaining and DNS server use.

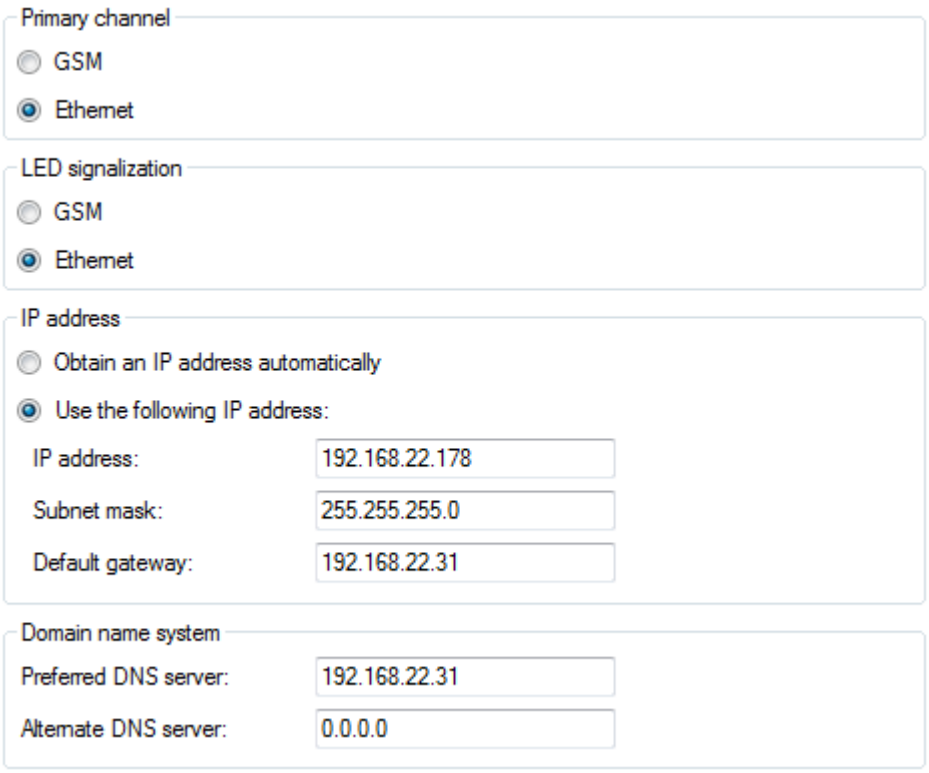


Figure: Ethernet Menu

Use the RS–232 and RS485/M–Bus tags to set communication parameters for each port. Set the password request enable and AT mode upon power up for RS-232. Use the WM-Bus tag to set the operating and decryption modes for the module.

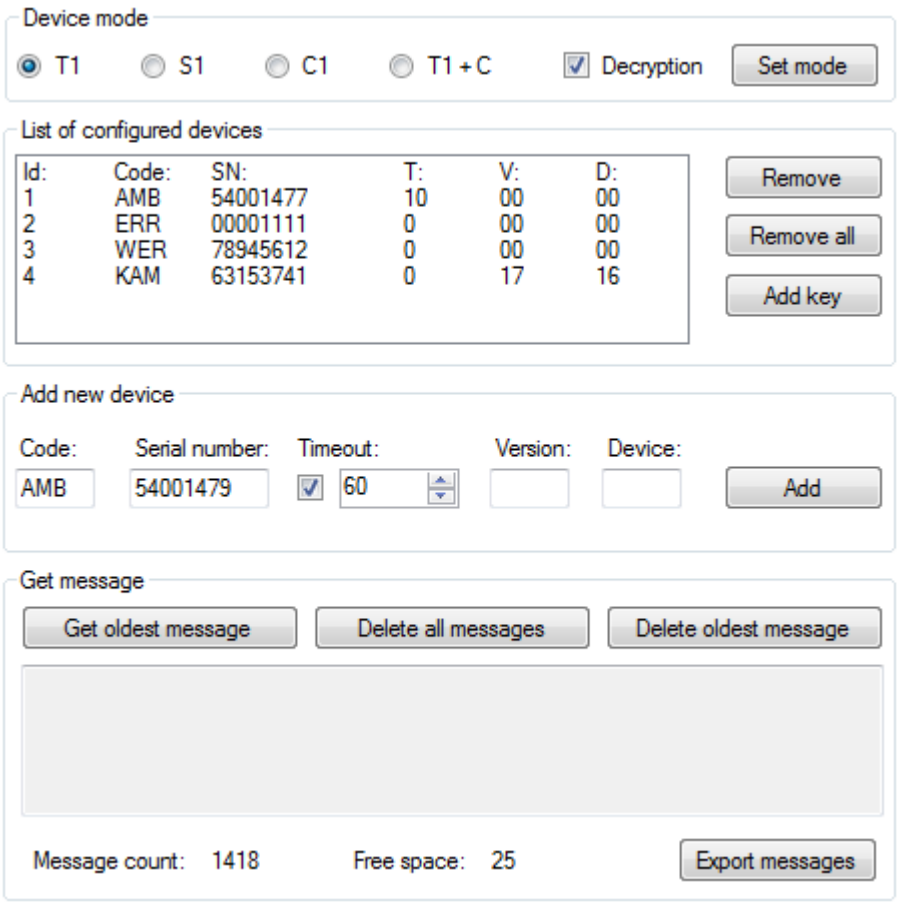


Figure: WM-Bus Menu

Click on the required item in the **List of configured devices** to select a device and push the buttons to the right to remove the item or add the decryption key.

Caution

- The keys are added to the WM-Bus module directly for security reasons and are not displayed in the configuration. Therefore, be careful while configuring the keys.
- A key adding error may lead to a decryption error.

Furthermore, you can **Add new device** to the list. Enter the device code and serial number. Complete the timeout, e.g., in case the selected device sends multiple identical pieces of information in a short time interval. The remaining parameters are optional and need not be specified.

Warning

- Contact the device manufacturer for precise identification details.
- Enter all the identification parameters of the new device to enable encryption in the device.

Display received messages in the **Get message** section. The messages are read from the database starting with the oldest one. The Message count parameter displays the count of received messages in the terminal and the amount of free space. When there is no free space, the oldest record will be deleted to make space for a new message. Push the **Export messages** button to export all the messages stored in the terminal into a PC file in order to make space for new messages.

The **Error buffer** helps you display the error codes captured during the operation. If no error has occurred since the last clearing date, ^SCERR: NO ERROR will be displayed. If an error occured, the error code will be displayed. Click on the Error code table button to display the message decryption window.

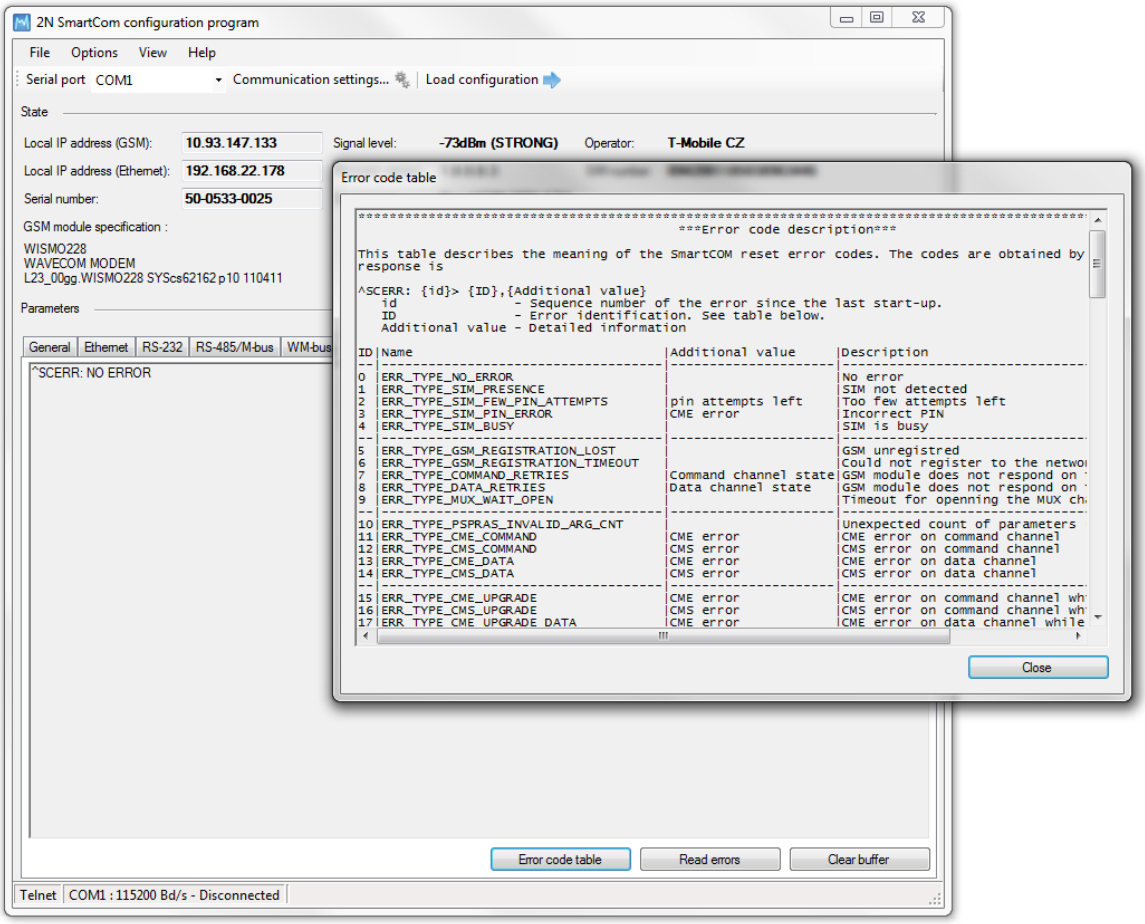


Figure: Error Buffer

Use the **Own AT commands** tag to enter commands of your own for parameter setting. The tag behaves like a terminal. Enter a string into the AT command field corresponding to the supported commands listed in Subs. 4.2. Click on **Send** to send the command to the connected **2N® SmartCOM** unit and get the reply in the field below the command. A list of 20 last-applied commands is displayed to the right.

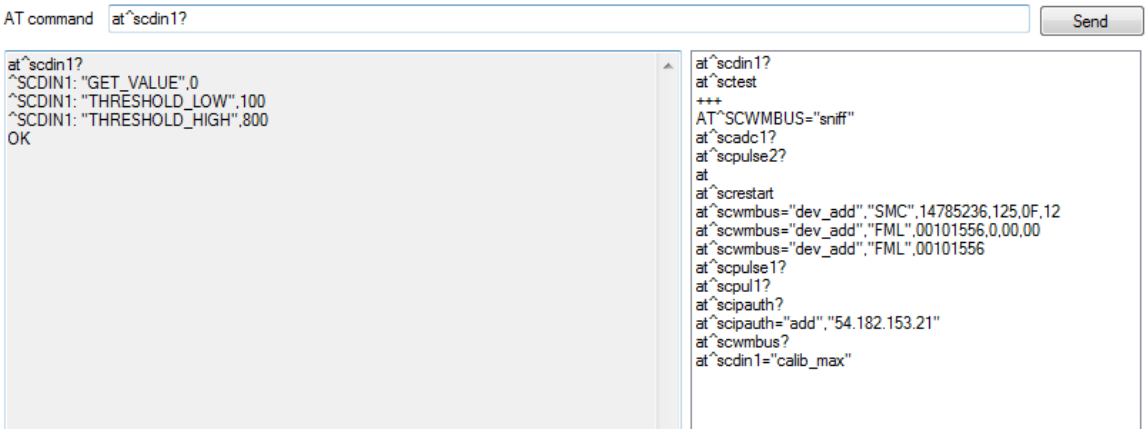


Figure: User Defined AT Commands

The last tag helps you upgrade firmware via the terminal COM port. Select the path to the current firmware file and press **Start** to initiate the upgrading process, which is signalled by the progress bar below. When the process is completed, the terminal will get restarted.

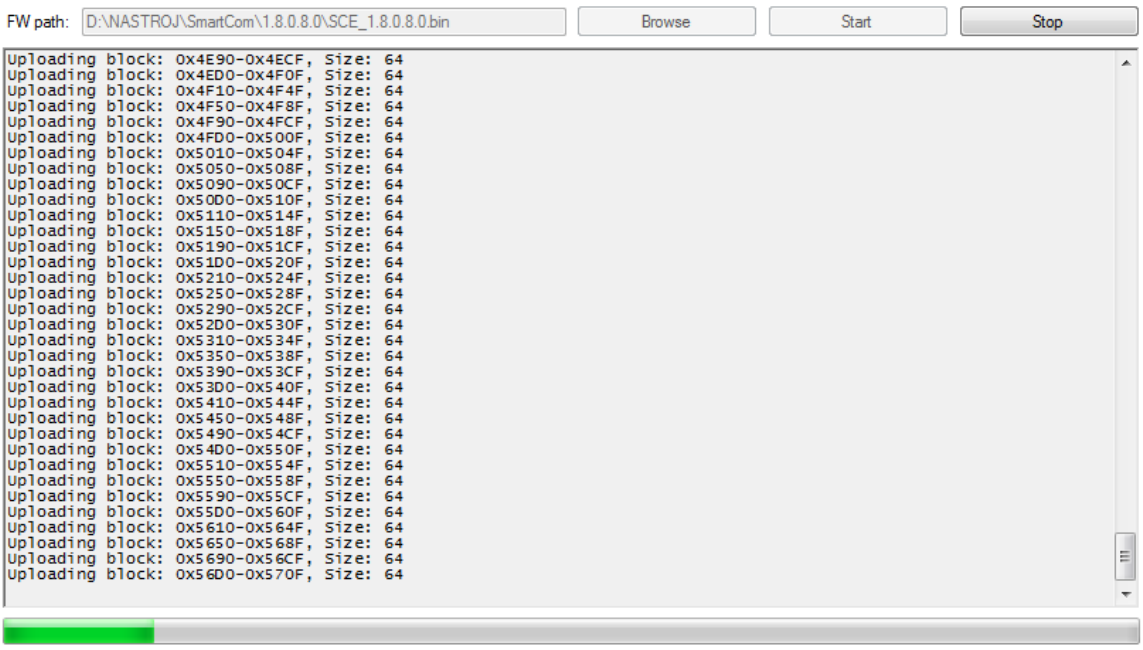


Figure: FW Upload

Caution

- Make sure that the terminal FW supports FW upgrade via the COM port to make the process successful. The minimum terminal FW version must be 1.4.0.

The **User defined functions** tag helps you set the UDF graphically and more easily in the application than using an AT command in the terminal. Just select the required functions and set their parameters and the application itself will generate the relevant AT command to be sent to the terminal, or to be stored for later use. Refer to **Console** for the current terminal communication listing and to **Current settings** for the list of configured commands in the terminal.

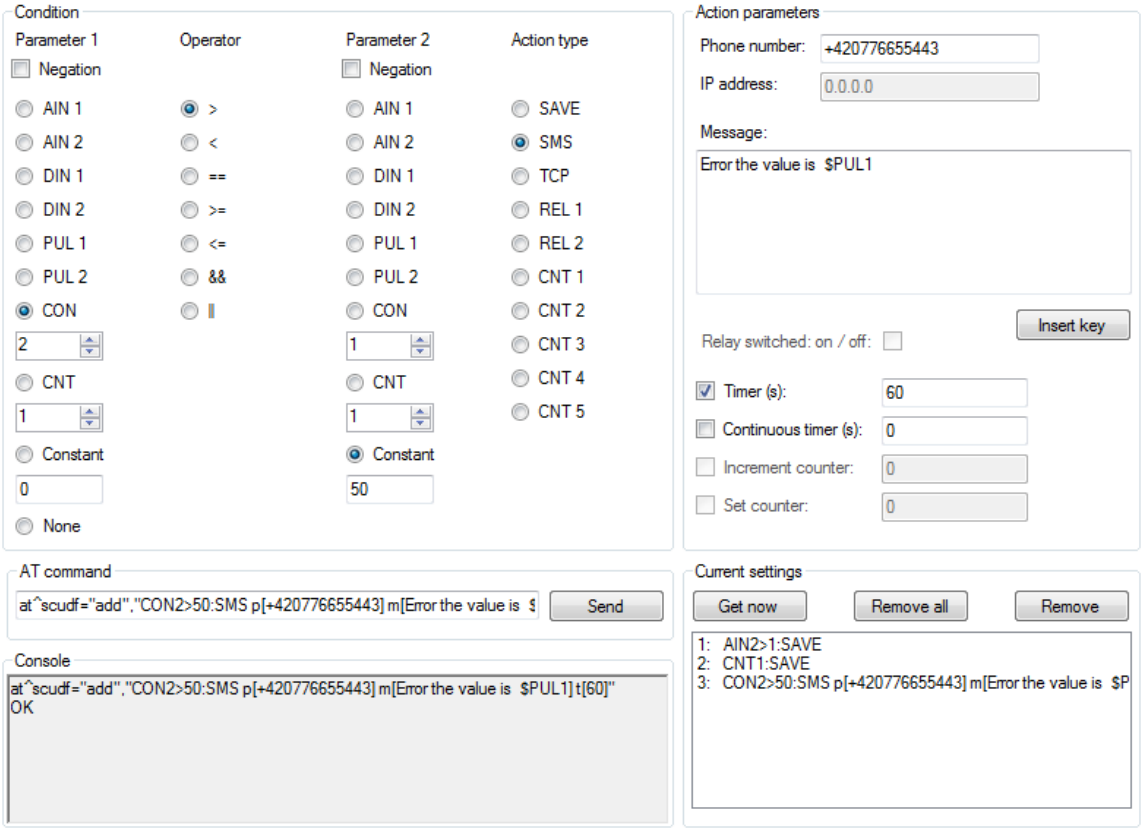


Figure: User Defined Functions Menu

Refer to S. 9 for more details on the UDF setting options.

The **RTC settings** tag displays the current date, time and time zone data. You can also synchronise the device time with your PC time, or set the device time manually. Click on **Save** to confirm the settings.

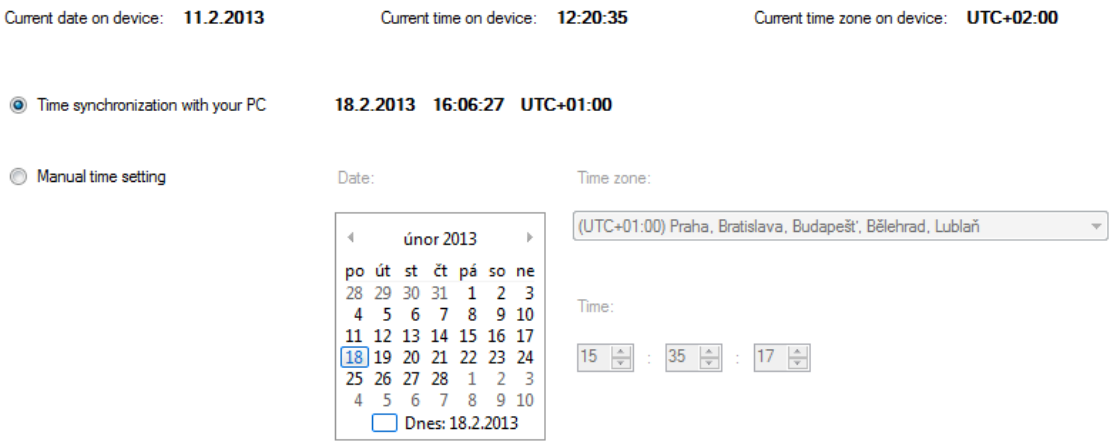


Figure: RTC Settings Menu

Charger is another setting option. It displays the back-up battery charging state for the **SC PRO** terminals. You can enable/disable the function and set the maximum charging voltage and current.

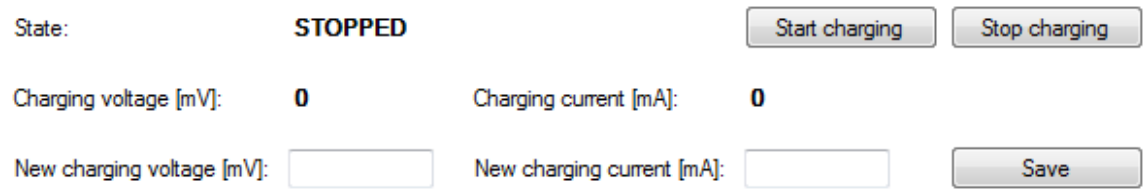


Figure: Charger Menu

IP access is the last accessible tag. You can define from which IP addresses it will be possible to access the terminal. Attempts from non-listed IP addresses will be ignored. Press **ON** to enable the function and **Add** to add an IPv4 address to the list. Click on an item for selection and push **Remove** to delete an address from the list.

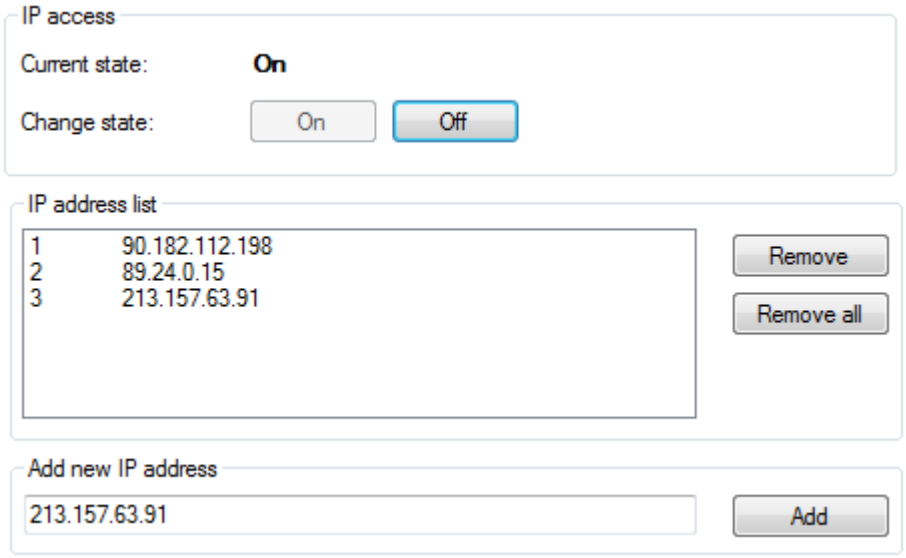


Figure: IP Access Menu

7. Control Panel

In this section, administration and use of the **2N® SmartCOM** product using the **2N® SmartCOM** Server and **2N® SmartCOM** Control Panel are described.
Here is what you can find in this section:

7.1 SC Server

2N® SmartCOM Server is an application necessary for the **2N® SmartCOM** Control Panel operation, providing communication between the **2N® SmartCOM** Control Panel and the terminal.

Caution

- The **2N® SmartCOM** Server must be installed on a PC accessible from a public Internet. Or, a NAT rule has to be defined to provide access to such PC. Otherwise, the terminals cannot be connected to the **2N® SmartCOM** Server. You can select the ports to be forwarded to your LAN via the NAT during installation.

Installation

Once launched, the installation program will scan your PC. If it finds another **2N® SmartCOM** Server version, it will ask you whether to uninstall. If you select No, the wizard will be terminated. If you select Yes, the current **2N® SmartCOM** Server version will be removed. Then you will be asked whether or not to remove the configuration files. If you select No, the current configuration will be retained and the application will only be updated.

Now the **2N® SmartCOM** Server Setup Wizard is launched. Follow the wizard instructions. Select the directory for the **2N® SmartCOM** Server to be installed. By default, C:\Program Files**2N® TELEKOMUNIKACE\2N® SmartCOM**SC Server is used.

Also select the port for the application to communicate with the terminals and other **2N® SmartCOM** Control Panel applications. Make sure that the port is accessible from the Internet (see above) and properly configured in all terminals and applications. Http accessibility is necessary as the selected port provides a listing of LOG files and can be used for firmware downloading to terminals. Firmware is downloaded whenever upgrade is initiated by the **2N® SmartCOM** Control Panel or the address is entered into the terminal.

Here you can also set the port for the AT API; refer to S. 8 for details. Now the wizard is ready to install the **2N® SmartCOM** Server. It displays the list of settings. Check the set parameters carefully as the values cannot be changed without reinstallation when the installation has been completed! If you find an error, push the **Back** button to return to the respective window. If all the settings are OK, push **Install** to continue. The wizard now installs the **2N® SmartCOM** Server.**The 2N® SmartCOM** Server service is launched automatically after installation. If the automatic launch fails for any reason, launch the service manually. Now the **2N® SmartCOM** Server is ready for use.

Note

- The **2N® SmartCOM** Server requires **500 MB** of free disk space at least for installation.
- **Use the 2N® SmartCOM Control Panel application to make changes in the 2N® SmartCOM Server settings**.

Licencing

All the **2N® SmartCOM** Server functions are subject to licence. For your first installation of the application onto your PC, you will receive the trial licence for 800 h operation and connection of 2 users and 2 terminals.

Caution

- The clock counter is increased by 1 by every **2N® SmartCOM** Server restart.

The **2N® SmartCOM** Licence Tool is installed together with the server. Having launched the application, you can see the version, ID and details on service settings for the server installed. See Figure.

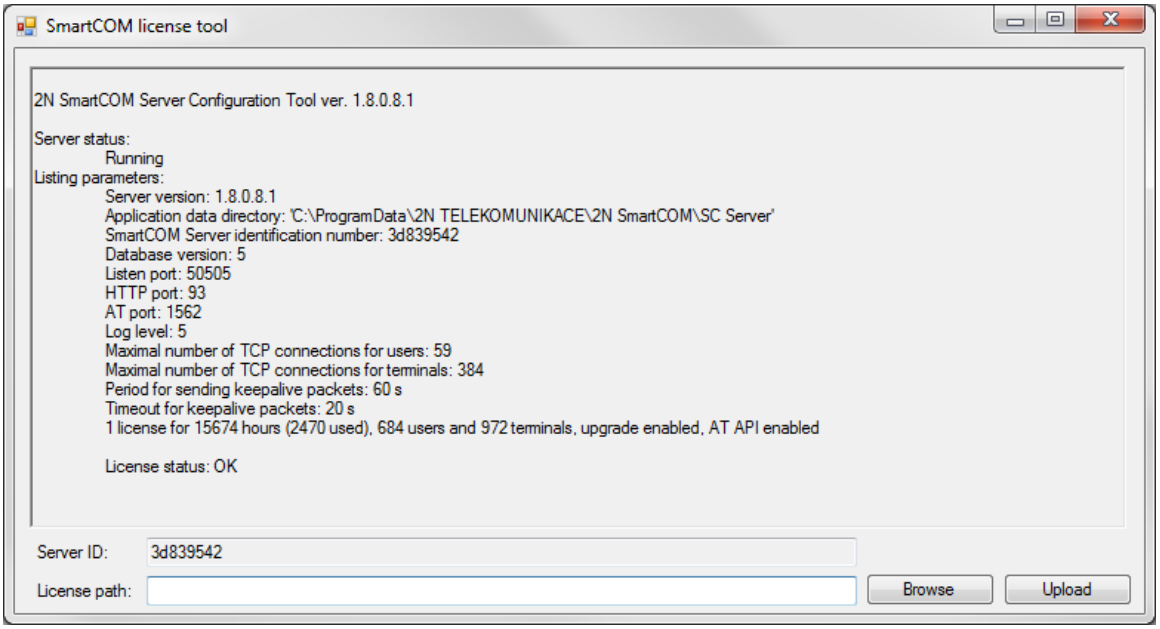


Figure: Licence Tool

A unique ID is generated for your server during installation. Send this code including your licence requirements to sales@2n.cz for an extended licence.

Having received the licence file, launch the Licence Tool application and enter the path to this file into the **License path** parameter. Push **Upload** to add the licence to the server directory and restart the server to update the licence data. The licence status

will change into OK. Now, the last row of the **Listing parameters** includes all the licensed server properties: count of users, count of terminals and AT API and terminal upgrade enable.

7.2 Control Panel

The **2N® SmartCOM** Control Panel provides a comfortable administration of terminals and users/user groups and assigns users relevant communication and administration rights. Also, it can create virtual TCPs and serial ports and connect terminals to them.

Caution

- The **2N® SmartCOM** Control Panel uses the English language version only.

Installation and Sign–In

Once launched, the installation program will scan your PC. If it finds another **2N® SmartCOM** Control Panel, it will ask you whether to uninstall or modify it. If you select Uninstall, the current **2N® SmartCOM** Control Panel version will be uninstalled.
Now the **2N® SmartCOM** Control Panel Setup Wizard is launched. Follow the Wizard instructions. Select the directory for the **2N® SmartCOM** Control Panel to be installed. By default, C:\Program Files**2N® TELEKOMUNIKACE\2N® SmartCOM**\ is used. Also, select whether the application shall be installed for the currently signed–in user or all PC users.
Now the wizard is ready to install the **2N® SmartCOM** Control Panel. It automatically adds an item to the **Start** menu and the application icon to the desktop.

Note

- The **2N® SmartCOM** Control Panel requires **150 MB** of free disk space at least for installation.

Now the **2N® SmartCOM** Control Panel is ready for use. Click on the shortcut icon on the desk top (see Fig. 7.1) or select the **Start** menu option to launch the application.
Upon the first launch, you will be asked to enter the username and password and then the server and server listening port. After you do so, use the **Sign in** item.

Figure: 2N® SmartCOM Control Panel Icon

Caution

- **Important!** A default user with the Administrator login was created during the **2N® SmartCOM** Server installation to make it possible to connect to the server and configure all the other users. The default user login data are as follows:
- **Username:Admin**
- **Password: 2n**

If you use one and the same PC for the **2N® SmartCOM** Control Panel and the **2N® SmartCOM** Server, you can enter the local loop address 127.0.0.1 or the local host text as the server address. To log in to another server, enter the local or public IP address. Or, use the DNS names if you use DNS. Enter the listening port into the **Port** i tem as selected during your **2N® SmartCOM** Server installation. Contact you network administrator for correct settings.

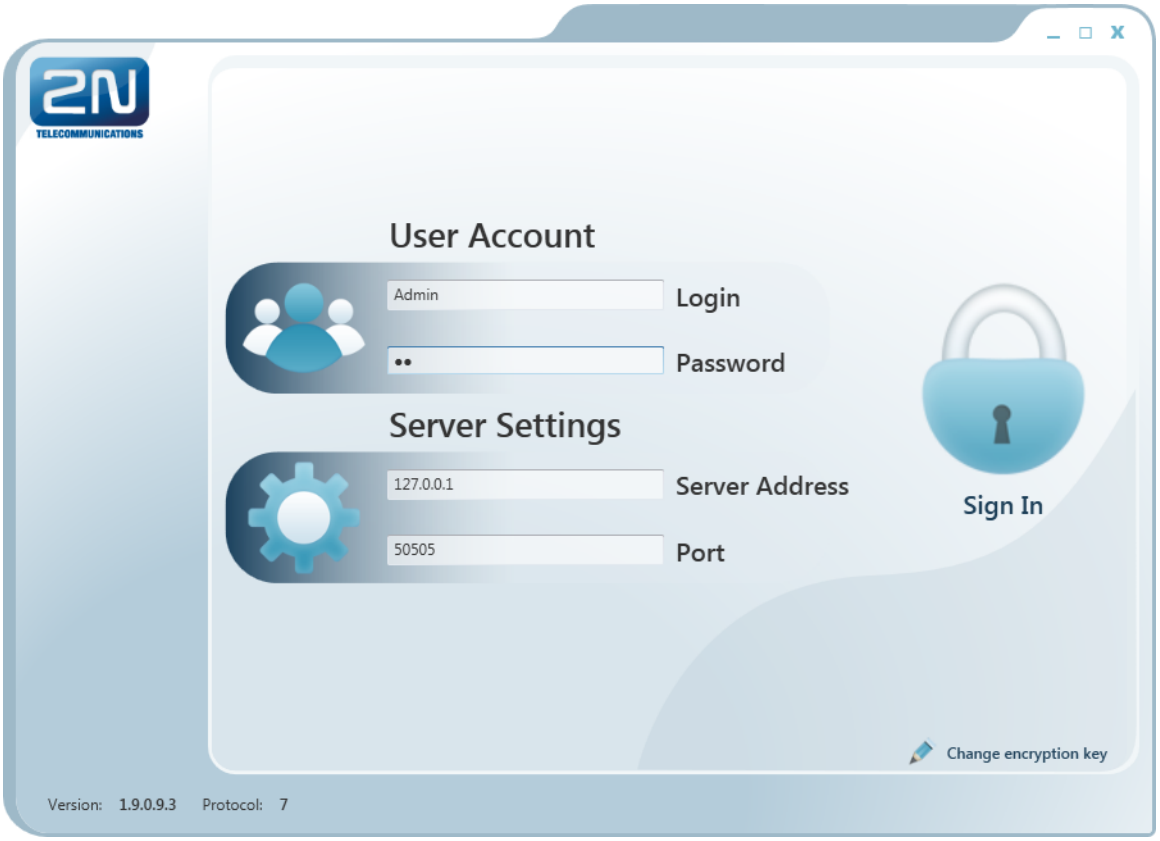


Figure: Sign–In Window

The encryption settings are in the right-hand bottom corner. Click on Change encryption key to display the encryption setting window. If the server requires so, enable packet encryption and set the key. Enter the key either in the ASCII format, where HEX is completed automatically with the translated characters, or enter the

HEXA key. The key length is 16 ASCII / 32 HEXA characters. Press OK to sign in with applied encryption. A message will notify a key error if any or encryption options if supported by the server.

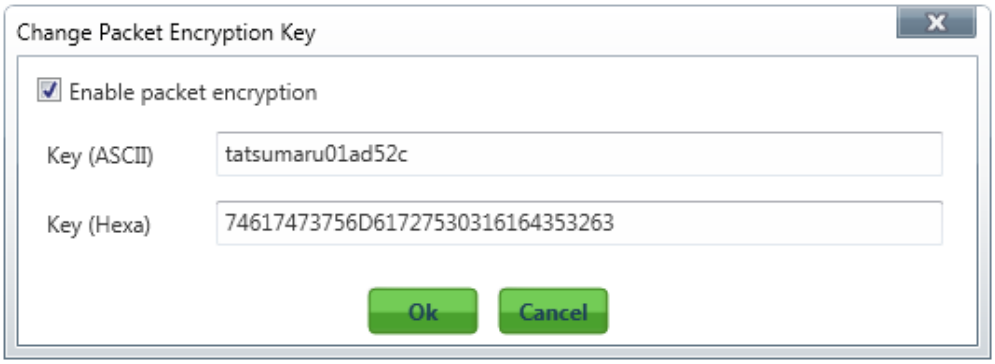


Figure: Encryption Settings

Introduction to Application

You will be shown the application layout and main controls in this subsection. The application can be viewed in two ways: the **User mode** and the **Admin mode**. The User may see the menus necessary for its work with terminals only. The Administrator also views the user/user group managing and server setting menus.
The **Status** line displays the following information: From the left: application version, currently signed–in user, count of configured terminals, count of on–line terminals, current server address, server listening port and application status.
Find the **Sign–out** button in the bottom part.

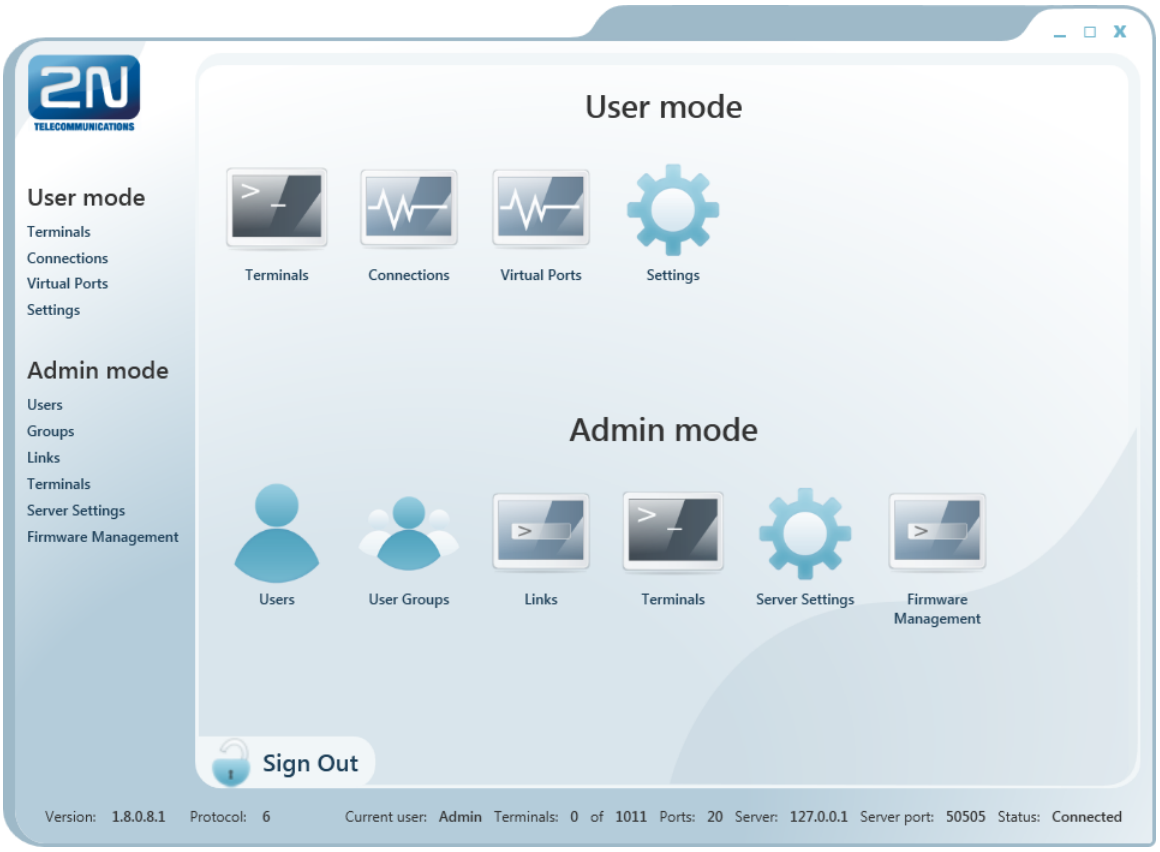
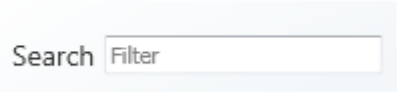


Figure: Application Window

Basic Controls

	Push the **Home** button to return to the main menu.
	Click on **Refresh** to update the status of objects in the selected menu, e.g. the terminal status in the **Terminals** or **Connections** menu.
	Push these buttons to **Start**/**Stop** communication with the terminal.
	Push the **Add user** button to add a user..
	Push the **Add group** button to add a user group.
	Push the general **Add** button to add an object to a group and create new virtual ports and terminals.
	Click on **Edit** to modify the parameters already configured.
	Click on **Remove** to remove an object from configuration.
	The **Change password** button changes the user password and may be used by the Administrator only.

	Push the **Create** button to create new objects.
	Click on the **Cancel** button to clear the currently made changes.
	Click on **Save** to save the currently made changes and send them to the **2N® SmartCOM** Server configuration.
	Use this button to install the virtual serial port driver.
	Push the **Sign out** button to log out the currently signed–in user.
	Use **Search** to search the relevant table columns.
	Use **Switch on**/**Switch off** to control the relay contacts.
	Use the button to display details on the terminal.
	Click on **Update** to upgrade firmware of selected terminals.
	Click on **Default** to reset the factory default values for all parameters.

7.3 Control Panel Use

The main purpose of the **2N® SmartCOM** Control Panel is to virtualised ports and facilitate connection to terminals. The application also provides comfortable administration and user management including assignment of terminal administration rights, thus allowing users to manage a high number of terminals from one place as well as assign small terminal groups to authorised users.

User Mode

Having singed in as the User, you get access to four items of the main menu only: **Terminals**, **Connections**, **Virtual Ports** and **Settings**. They are all you need for standard work with the terminals. You have been assigned to one of the groups by the Administrator and so you are allowed to view the terminals assigned to this group only. See below for details on the menus.

Terminals

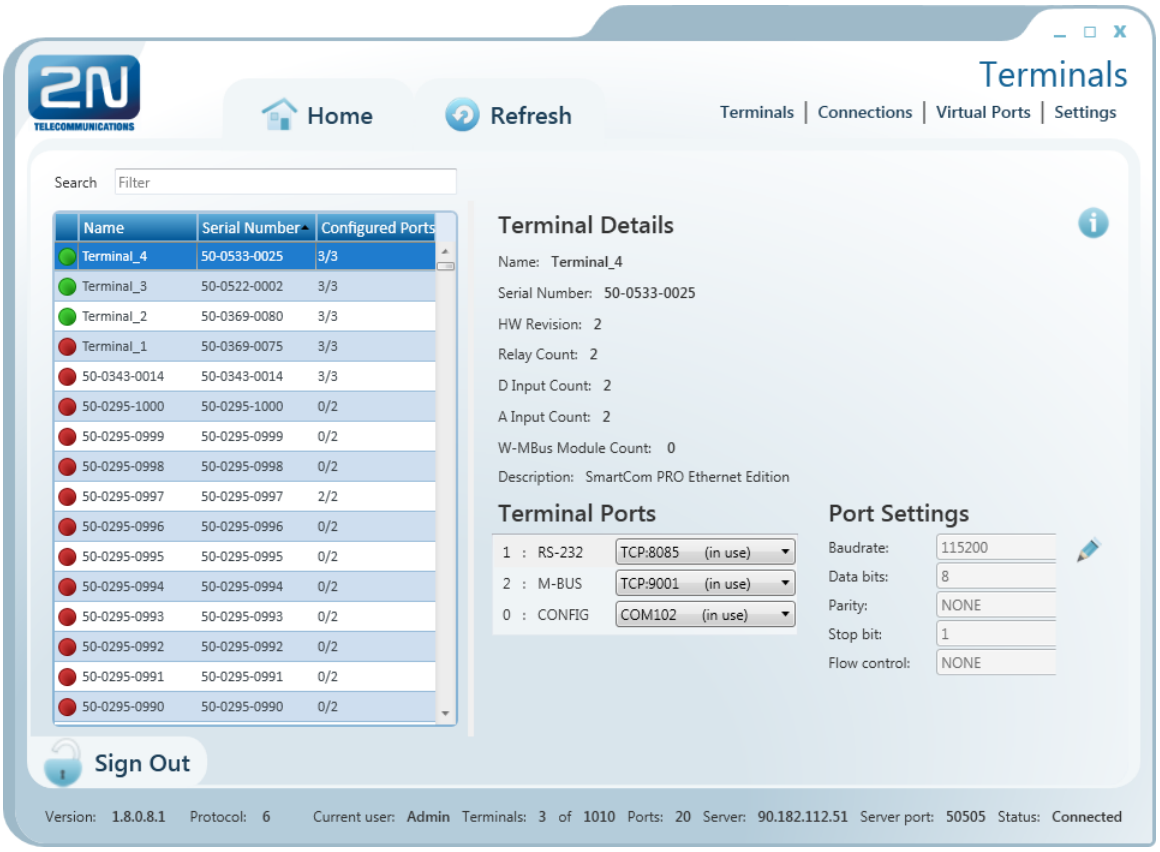


Figure: User Mode Terminals Menu

The **Terminals** menu displays the terminals assigned to the group you have the right to view.

A green dot before the terminal means that the terminal is on–line (connected to the server) and you can get connected to it. A red dot means that the terminal is off–line.
Click on a selected terminal on the right to display the **Terminal Details** window including the name, serial number, hardware revision number and count of available relays and digital and analogue inputs. Notes are also displayed on the terminal if available.
If you are a user, you can select a virtual port for terminal connection. The **Virtual ports** can fully be administered by the user; refer to the **Virtual Ports** subsection below. If you select an unoccupied port, the port will be marked 'in use' signalling to the other users that the port is engaged in the configuration.
If you have the appropriate user right, you can also set the communication parameters for the selected port including the transmission rate and others even if the terminal is connected and used for data transmission. Select the parameters using the combo boxes and the changes will be effective the moment they are saved.
Click on the **Info** button in on–line terminals to display details on the connected terminal, relay control and values measured on analogue and digital inputs.

Figure: Terminals Menu Terminal Details

The **Terminal Details** include the following data: GSM module IMEI (International Mobile Equipment Identity), name and number of the GSM provider at which your **2N® SmartCOM** is registered, signal intensity in dBm, ICCID (Integrated Circuit Card ID) and IMSI (International Mobile Subscriber Identity). The In roaming parameter indicates whether the SIM card is used in the roaming mode. Moreover, the **2N® SmartCOM** terminal serial number and current firmware as well as information (firmware version, manufacturer and type) on the GSM module used are displayed.
You can switch the relay contacts in the **Relays** section. The **Digital Inputs** displays the value currently measured at the input and transformed to a logic value (0 or 1) as calibrated. The **Analogue Inputs** displays the values measured at analogue inputs. The Calibrated and Absolute parameters include the percentage against the calibrated range and the absolute value against the A/D converter range respectively.
Refer to Subs. 3.3 and 3.4, Input Circuits, for more details on input circuit function and calibration.

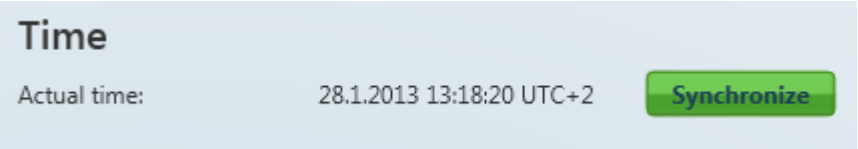


Figure: Terminal Time Synchronisation

The time setting supporting **PRO** and **PRO ETH** terminals also display the terminal time. Click on **Synchronize** to set the same time value for the terminal as there is in the server.

Connections

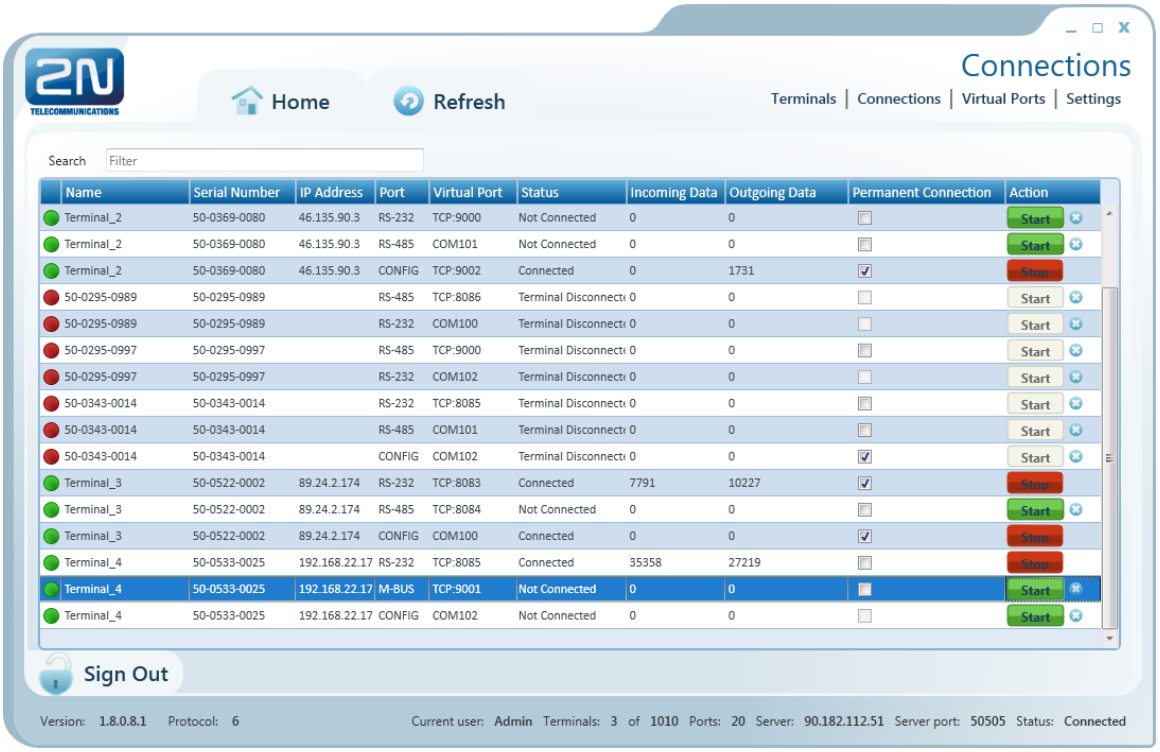


Figure: Connections Menu

The **Connections** menu contains a table showing the terminals that are assigned a virtual port. The table includes the terminal name, serial number, IP address and physical port to be connected to the selected virtual port. The **Status** field defines the current of the terminal:

- **Not Connected** - the terminal is on-line connected to the server and ready for virtual port connection.
- **Connecting** - the terminal - virtual port connection is in progress.
- **Connected** - the terminal has been successfully interconnected with the virtual port.

- **Disconnecting** - disconnection from the virtual port is in progress.
- **Terminal Disconnected** - the terminal is off-line, i.e. has been disconnected from the SC server.
- **Disconnect by other user** - the terminal has been disconnected by another user. This means that the other user has interconnected its virtual port with this terminal.
- **Error** - an error occurrred during connection or disconnection.

The **Incoming** and **Outgoing Data** fields display the amount of data transmitted in the given direction and are for information only. Check off **Permanent connection** to enable automatic terminal connection to the virtual port upon the application start.
Press **Start** to interconnect the terminal with the virtual port. If one and the same port is used by multiple terminals, the other users will not be able to press **Start** until the first connection has been finished. Refer to the note below. Push **Stop** to terminate communication.

Note
- Although there may be multiple terminals assigned to a virtual port, one terminal can only be assigned to the port within one connection.

In case another user is connected to the terminal, the **Start** button has an orange background colour. You can push the button to disconnect the original user and connect the terminal with your virtual port.
Use the cross to remove the selected row from the table, thus cancelling interconnection between the virtual port of the application and the physical port of the terminal easily.

Virtual Ports

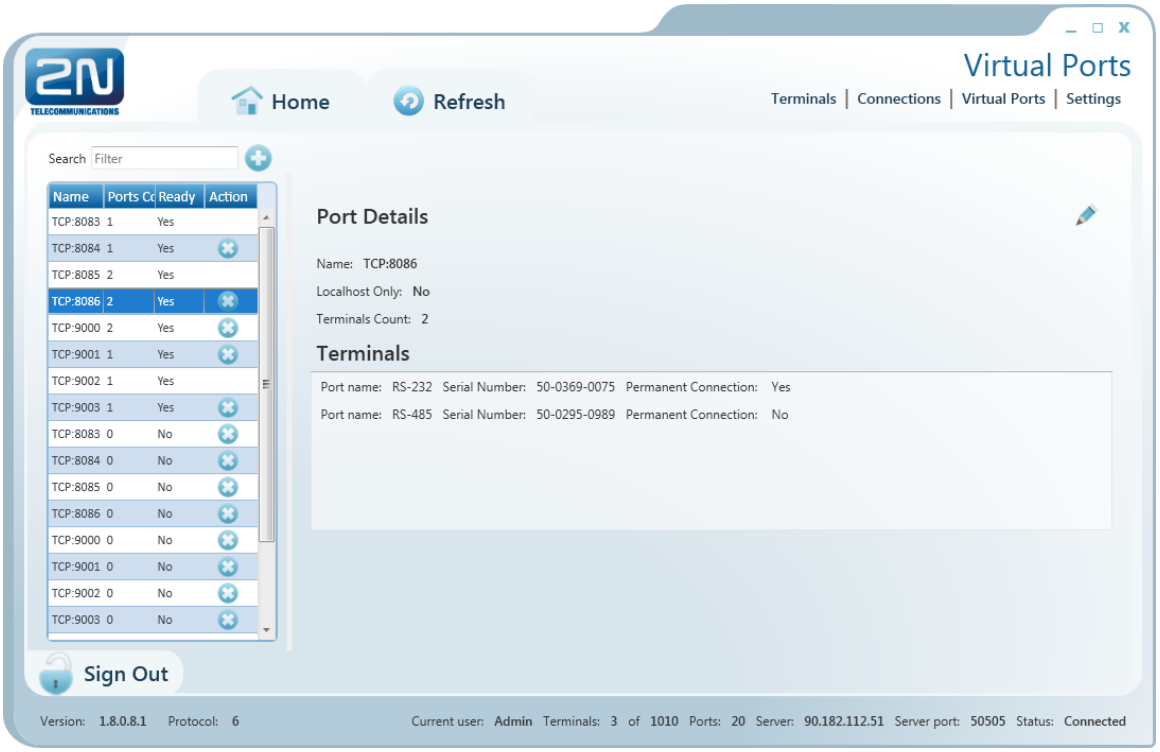


Figure: Virtual Ports Menu

Administer virtual ports using the **Virtual Ports** menu. Every user can use this menu as these settings only relate to the PC with which the user is working. This means that where more PCs are used, the user must create the virtual ports for each of them. This, however, applies to serial ports only; virtual ports are transferable to other PCs. This option, however, can be disabled in the configuration.

Create TCP Port

To create a virtual TCP port, select **Add** and enter the port to be created. Also, tick off **Allow local host only** to enable the port use for the current PC only. Finally, click on **Create**.

Figure: Create TCP Port

Create COM Port

A virtual COM port is created similarly as instructed above. Just select a port and click

on **Create** to make the com0com driver install the selected port into the PC.

Figure: Create COM Port

Having installed a COM port into the PC, activate the COM port. Although the port has been added to the **Virtual ports** table, the **Ready** item shows NO. Therefore, click on this table row to view the port details and the **Refresh** button. Push the button to change the port status from Ready – NO to Ready – YES.

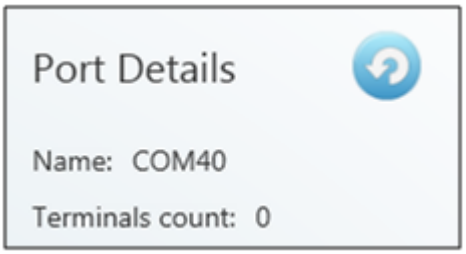


Figure: Refresh Button

Settings

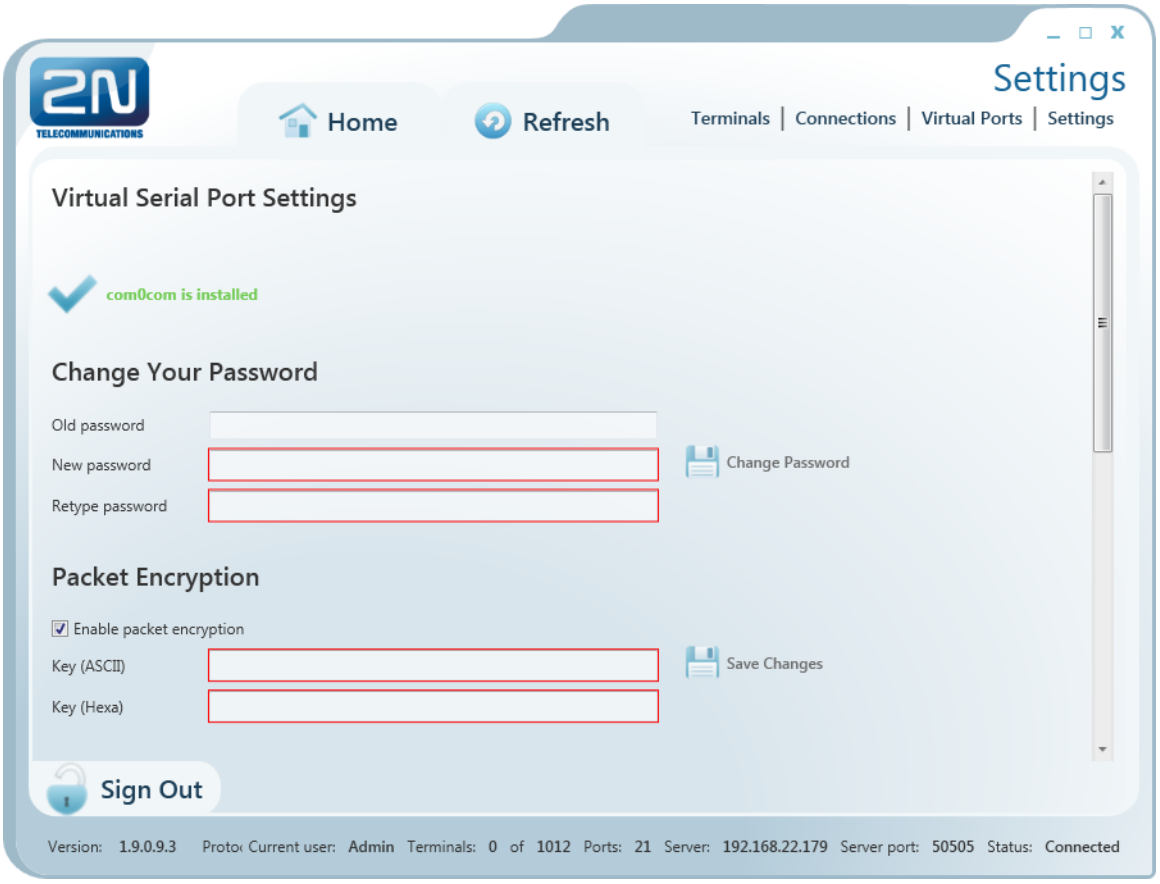


Figure: Settings Menu

You can change the user password in the **Settings** menu. Enter the old password and then the new one. The minimum password length and correctness is checked by the parameters. Save the setting using the **Change password** button.
The menu also displays the installation states of the virtual serial port drivers. If no drivers have been installed, you cannot use or add serial ports in the **Virtual ports** me nu. If the com0com driver is not installed, the 'com0com is not installed' message gets displayed as shown in Figure. You can install drivers for 32 and 64–bit systems too.
If the installation process is successful, the 'com0com is installed' will be displayed.

Caution

- You need the Admin rights for the PC used for com0com installation. If you do not have such rights currently, the installation will offer you an Admin login option.

Note

- The installation requires **0.5 MB** of free disk space at least.

The menu also includes encryption key settings for server communication, like in the

sign-in window. Tick the checkbox to enable packet encryption. Enter the selected key into the Key field and save the setting. The setting will not be applied until you sign out. Moreover, you can set the configuration export/import options. Select the Virtual ports, Connections and/or Permanent connections in the Export Settings item to transfer your configuration to another PC. Choose the export destination and press Export to execute the operation.

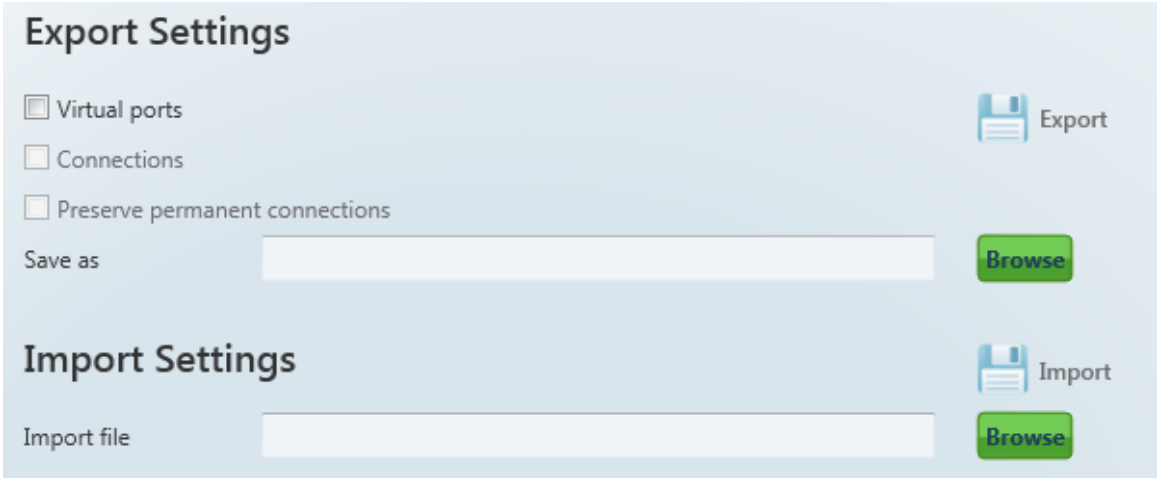


Figure: Setting Export / Import

To import your configuration, sign in as the user to which you want to import the settings. Make sure that this user is identical with the user from which export was made to create a correct configuration file. Now you can load the new configuration onto any account. Select the file to be imported and press Import to import the data. The change will be applied when the user signs out and in.

Moreover, you can set **Automatic sign-in** in this menu. If you enable this function, the application will automatically log in to the server within a preset time interval. If you interrupt autologin in this interval, you can change the login data and sign in as another user, or to another server.

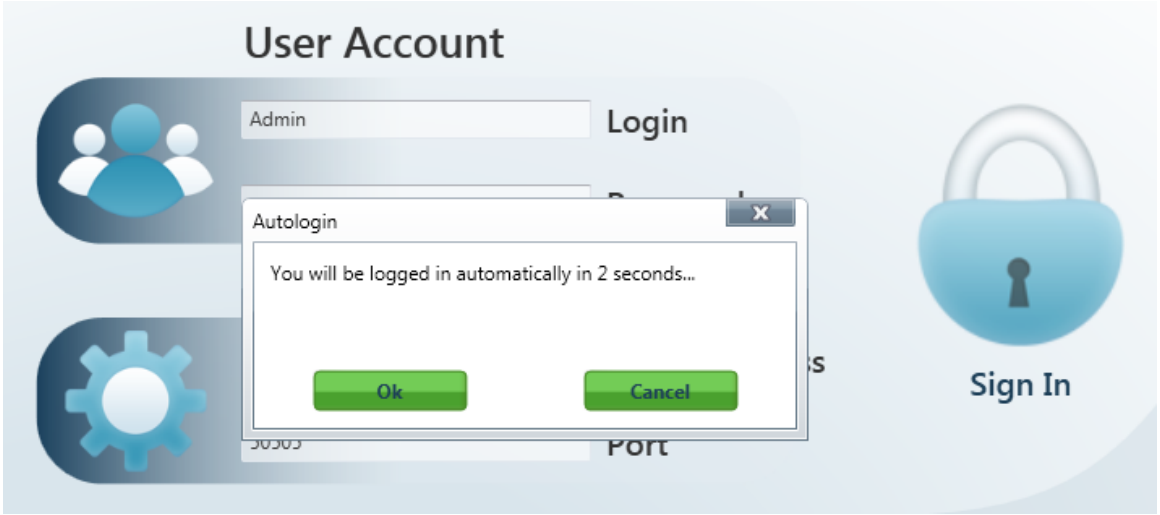


Figure: Autologin

Caution

- By interrupting automatic login you also disable the **Allow automatic login** parameter. Thus, you will have to re-enable it to use autologin again.

The application **Logging** checkbox helps you debug the application or just record server communication.

The files are automatically split after reaching 10MB.

Admin Mode

The Admin user has access to all User mode menus plus the user and terminal administering and server setting menus. The **Admin mode** menu includes the **Users**, **Groups**, **Links**, **Terminals, Server Settings** and **Firmware Management** menus. See the subsections below for details.

Users

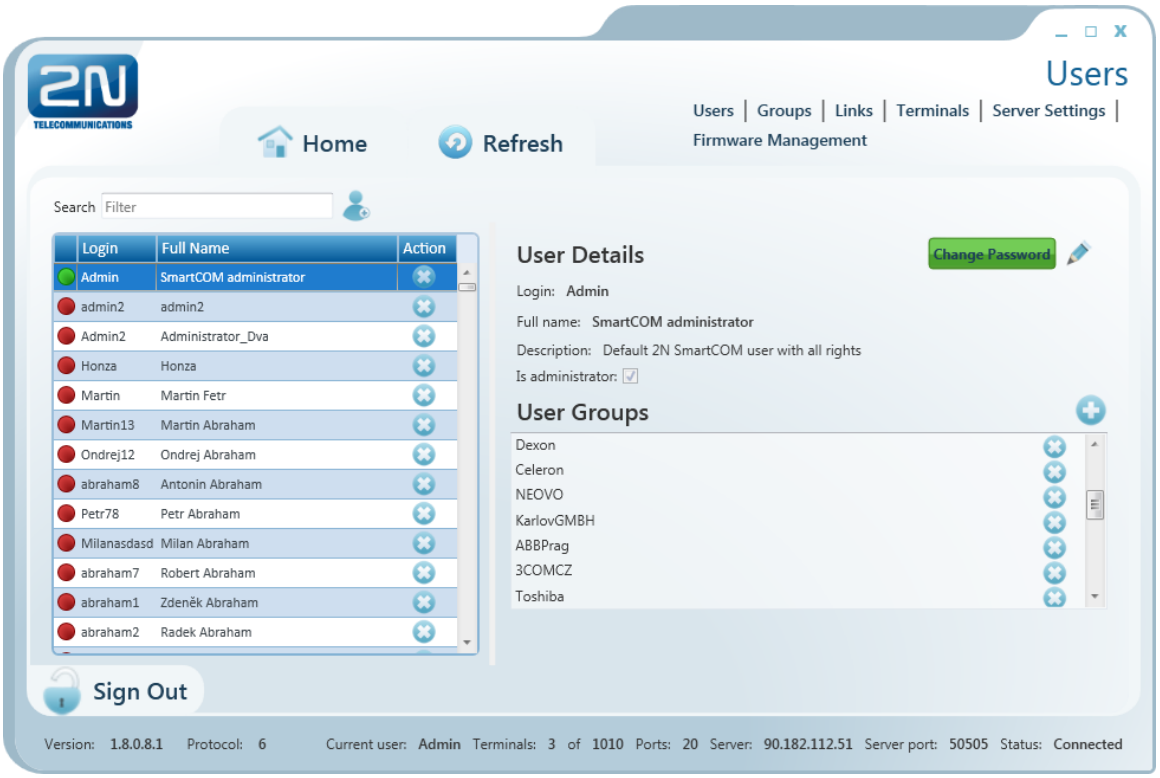


Figure: Users Menu

The **Users** menu is used for user administration. The list of users is on left. A green dot before the user name means that the user is on–line (connected to the **2N® SmartCOM** Server). A red dot means that the user is off–line (logged out).

Click on the user to display the **User Details** including the full name, login, notes and Admin flag if available. By clicking on **Change password**, the Administrator can change any user password without knowing the original one. This is mainly useful for those users who forget their passwords. Click on **Edit** to change the user details.
The **Groups** menu contains the user groups to which the user is assigned. Click on **Add** and select an item from the list to create a new group. Push **Remove** to remove a group from the list.

Add user

Click on the **Add user** button next to the filter setting. You will be asked to complete the login, full user name and password to ensure a proper function. The parameters are limited and you will be checked during entering. No name or login may be duplicated in the configuration. You will be notified of any duplication in the configuration. You can also add a note and/or the Admin mode to the user by ticking of the **Is Administrator** option. Click on **Create** to create a new user.

Groups

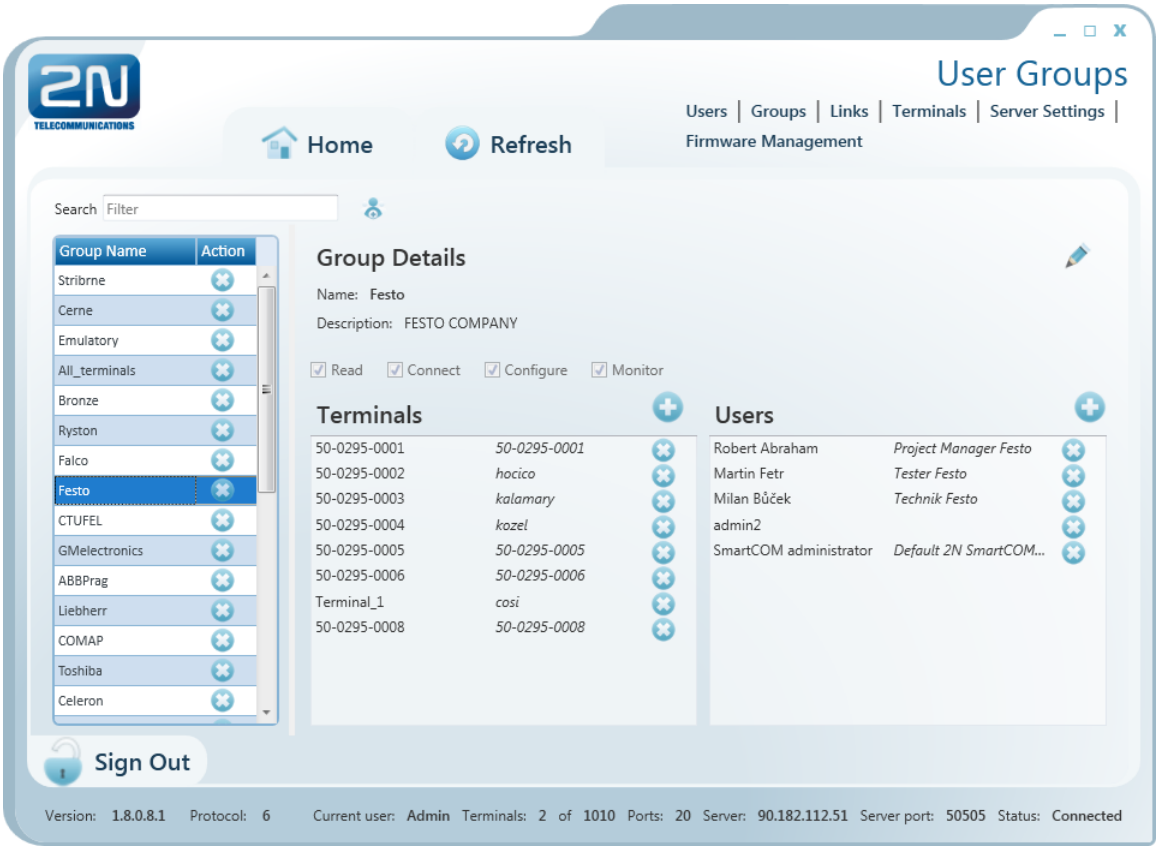


Figure: User Groups Menu

The **Groups** menu helps you group users and terminals. As it is unnecessary for all users to view and manage all terminals, you can create small user groups for terminal data reading and administering.
Click on a group to display the **Group Details** including the full group name, notes if any and rights assigned to the group. Click on **Edit** to change these parameters.
There four group right categories:

- **Read –** users with the **Read** right may view the terminals and monitor their states without being able to configure then or connect to them.
- **Connect –** users with the **Connect** right may view and also connect to the terminals via the **Connections** menu.
- **Configure –** users with the **Configure** right have the advantages of the two user groups above and, moreover, may configure the communication parameters of the terminal ports.
- **Monitor –** not implemented yet. Prepared for future use.

Use the **Terminals** menu to add/remove the terminal to be viewed by the users assigned to this group. Click on **Add** and select an item from the list to add a terminal. Click on **Remove** to remove a terminal from the list.
The **Users** menu includes a list of users assigned to this group. Click on **Add** and select an item from the list to add a user. Click on **Remove** to remove a user from the list.
Add Group
Click on the **Add group** button next to the filter setting. You will be asked to complete the group name and rights to ensure a proper function. The parameters are limited and you will be checked during entering. No name may be duplicated in the configuration. You will be notified of any duplication in the configuration. You can also add a note to the group. Click on **Create** to create a new group.

Links

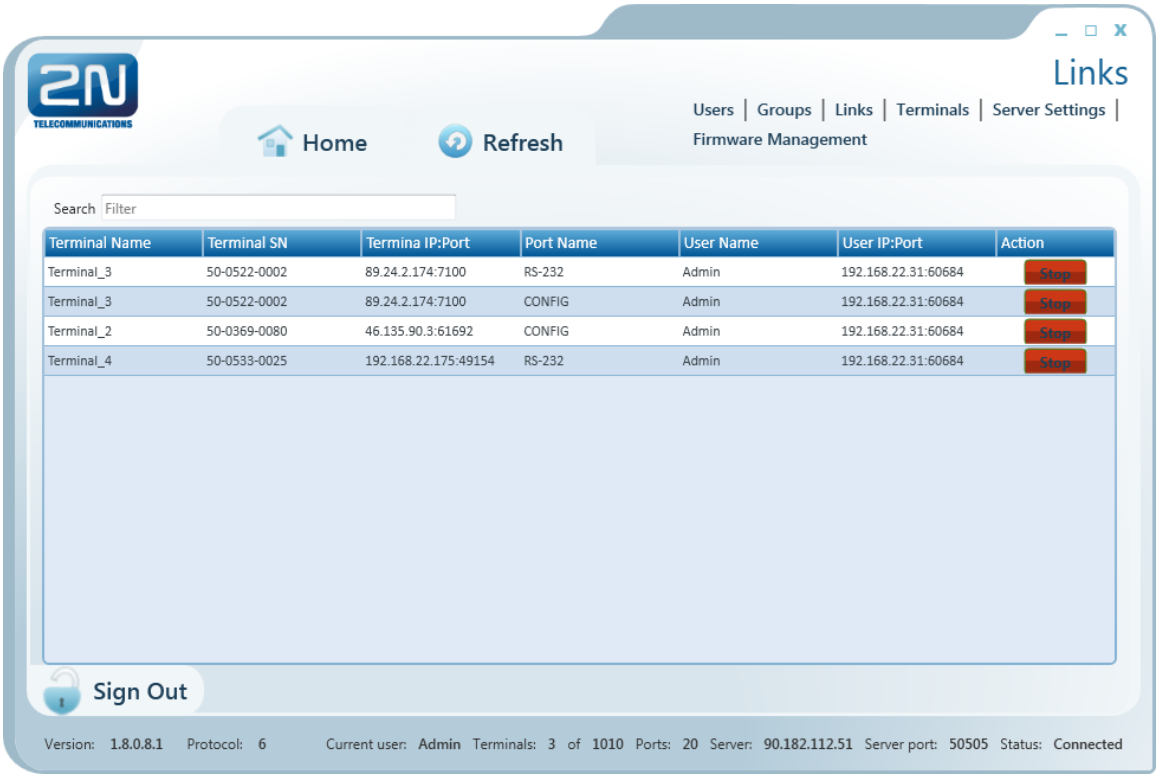


Figure: Links Menu

The **Links** menu displays the currently connected terminals and users. The Administrator can supervise and disconnect them if necessary. The table includes the

serial number, IP address and port of the selected terminal, the user currently working with the terminal, the user IP address and active port. Find the **Stop** button in the **Action** field.

Tip

- The **Stop** button is used for unconditional disconnection of a terminal from the virtual ports regardless of the data transmission state.

Terminals

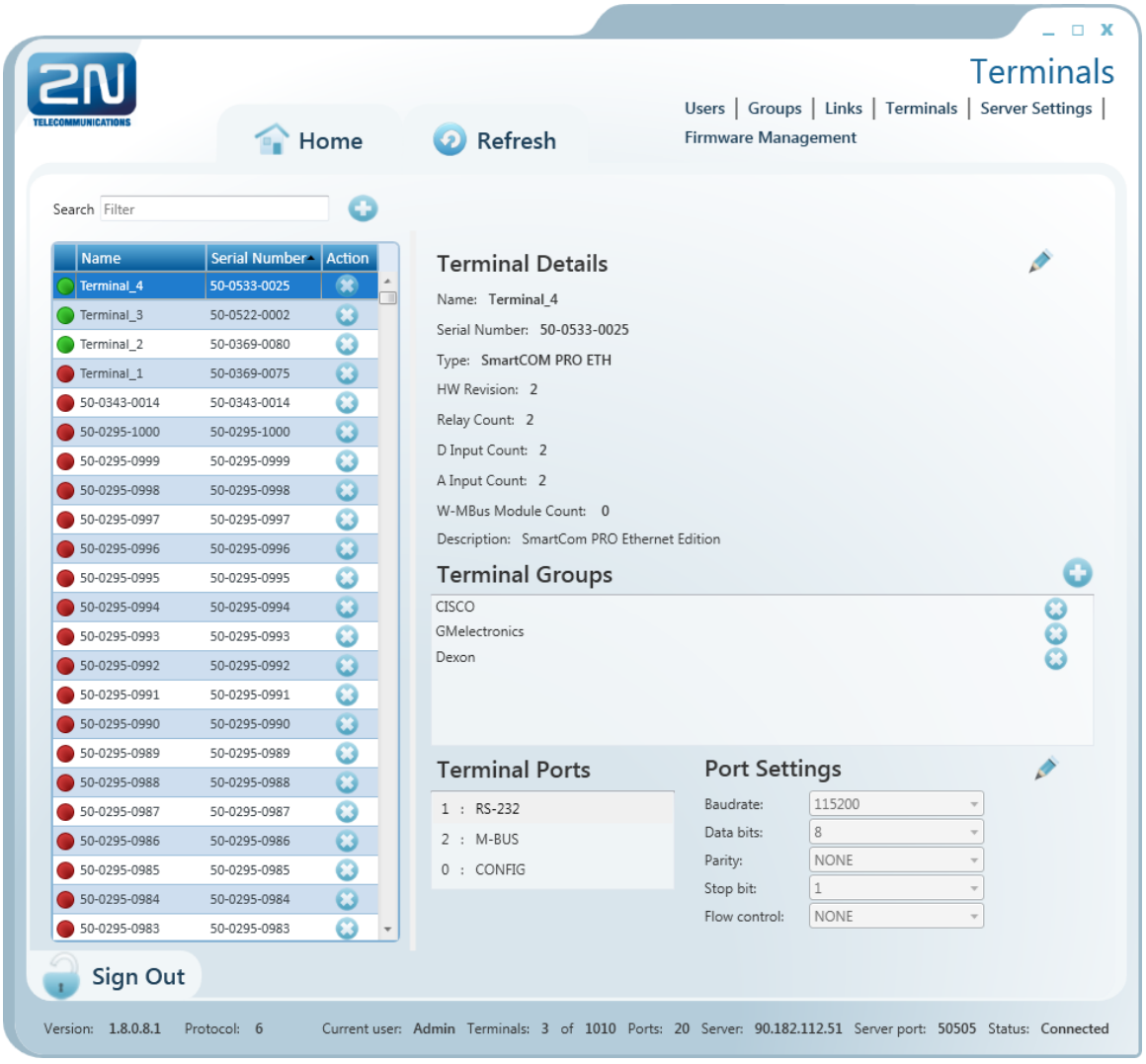


Figure: Admin Mode Terminals Menu

The **Terminals** menu in the Admin mode is similar to that in the User mode but is extended by group assignment, terminal adding and terminal editing options.
A green dot before the terminal means that the terminal is on–line (connected to the server) and you can get connected to it. A red dot means that the terminal is off–line.
Click on a terminal in the right–hand part of the screen to display the **Terminal Details** including the terminal name, serial number, hardware version as well as count

of available relays and digital and analogue inputs. Notes can be added if available. Click on **Edit** to change the terminal details.
Specify in the **Terminal Groups** in which group the selected terminal shall be visible (i.e. which group shall be allowed to use this terminal). Click on **Add** to add a group. Click on **Remove** to remove a group from the list.
You can also set communication for the RS–232 and RS–485/M–BUS ports even if the terminal is connected and used for data transmission. Select the parameters using the combo boxes and the changes will be effective when saved.

Create Terminal

Click on **Add terminal** next to the filter to create a new terminal.

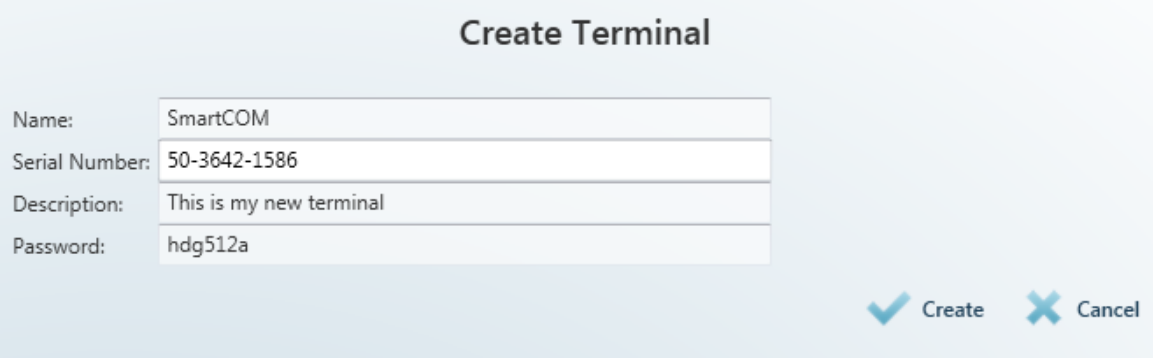


Figure: Create Terminal

To add a terminal, enter the terminal name, serial number and password. The parameters are limited and you will be checked during entering. No name or serial number may be duplicated in the configuration. You will be notified of any duplication in the configuration. Click on **Create** to create a new terminal.

Server Settings

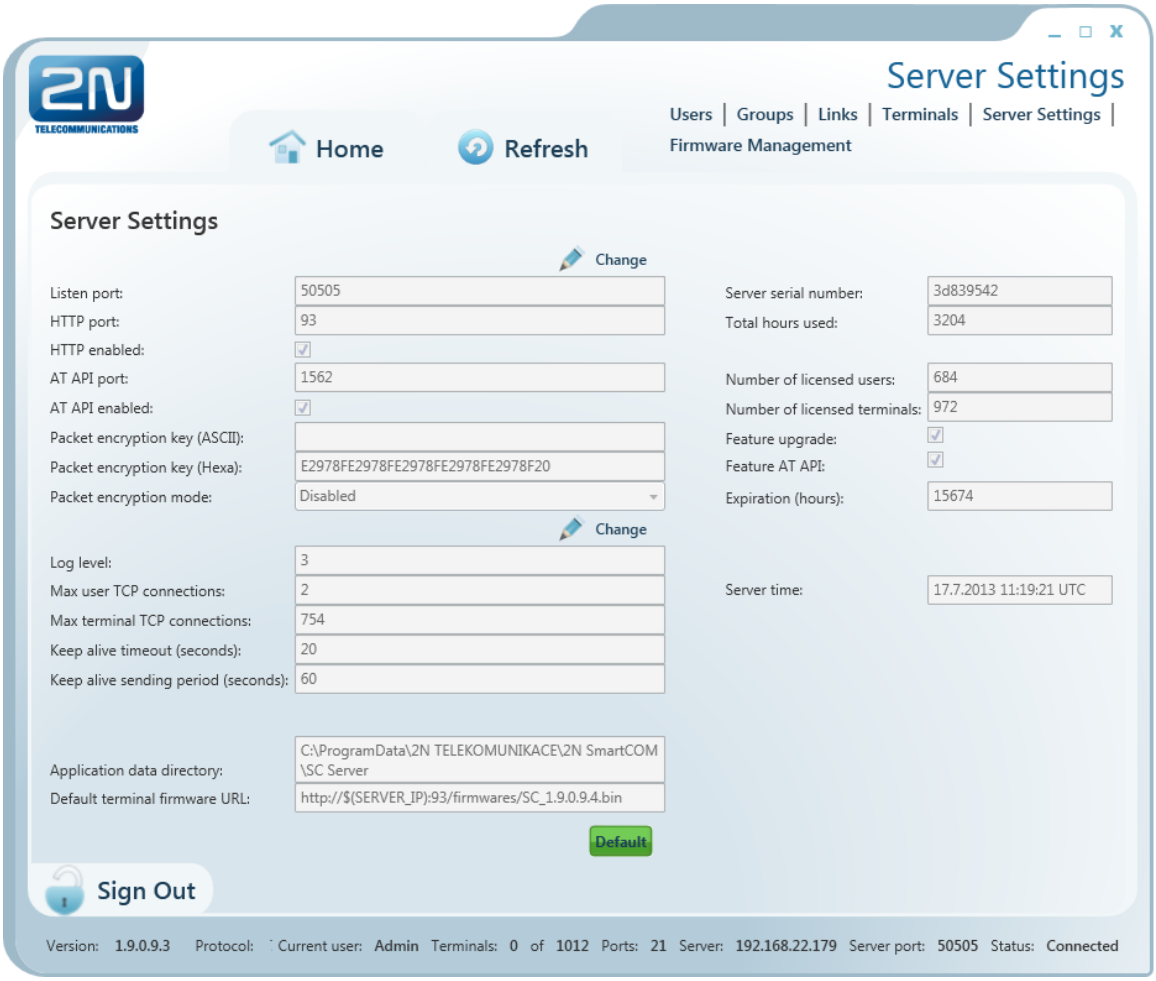


Figure: Server Settings Menu

The **Server Settings** menu contains the **2N® SmartCOM** Server settings. The menu has two parts.
The first menu part affects the server function directly and any change may to lead to restart and subsequent disabling of work of other users. Set the listening port and http port and enable the http daemon here. The user AT API settings are available here too. Set the port for API connection and communication. There is a button for you to enable/disable the API. Futhermore, set packet encryption for the server. You can enter ASCII characters, which will automatically be translated into Hexa for later server settings. The key length is 32 hexa / 16 ASCII characters. Or, you can enter hexa characters. The ASCII field is thus not applied. See the figure above. Set the encryption mode in the Packet encryption mode parameter. There are three options.

- DISABLED – **2N® SmartCOM Server** does not encrypt any data.
- OPTIONAL – **2N® SmartCOM Server** encrypts data if the counterparty requires so.
- FORCED – **2N® SmartCOM Server** encrypts all incoming and outgoing data.

Caution

- **Important!** A change of these parameters will affect the server function directly. Remember the changed values for later use. For example, if you change the **Listen Port**, you will have to enter a new port during login. If you forget it, you will have to reinstall the whole server!
- **The web interface connection is only possible from the IP addresses from which the terminal or Control Panel were connected.** Any other connecting attempts will be rejected to avoid server violation.

The other part does not affect the server function. You can modify the **Log level** settin g, which is a digital value specifying how detailed the LOG file should be. The setting options are 1 – 5. The default value is 3.
The **Max user** and **Terminal TCP connections** items are automatically set to the highest possible value according to the licence. Enter the required count of connections if necessary. If you exceed the licence limit, the application will automatically limit your selection to the upper limit allowed in the licence.
Also, set the **Keep Alive** packets. The default value is an optimum solution and need not be changed. Should problems occur with the NAT use on application–server–terminal route, lower the time values. The **Application data directory** parameter shows the path to the directory where the **2N® SmartCOM** Serv er saves the LOG files and is for information only.

Note

- The Application data directory shows the location of the server LOG files. Hence, it is only in the PC on which the **2N® SmartCOM** Server is installed. You will not find this directory on the PC from which you launch the **2N® SmartCOM** Control Panel and log in to the **2N® SmartCOM** Server remotely!

Default Terminal Firmware URL is the address that can be used for firmware upgrade for the terminals. This firmware corresponds to and is fully compatible with the version of your **2N® SmartCOM** Server and Control Panel.

Caution

- Remember to keep the firmware address format. The currently valid address is available in the **Server settings** menu. If you enter this link into the terminal, the terminal will replace the sequence of characters '$(SERVER_IP)' with the address of the currently connected server.

The non-editable column to the right includes information on the server to which you are connected such as serial number, licensed hours, maximum counts of users and terminals, upgrade enable/disable and AT API functions. It also shows the remaining server operation hours and the current server time.

Firmware Management

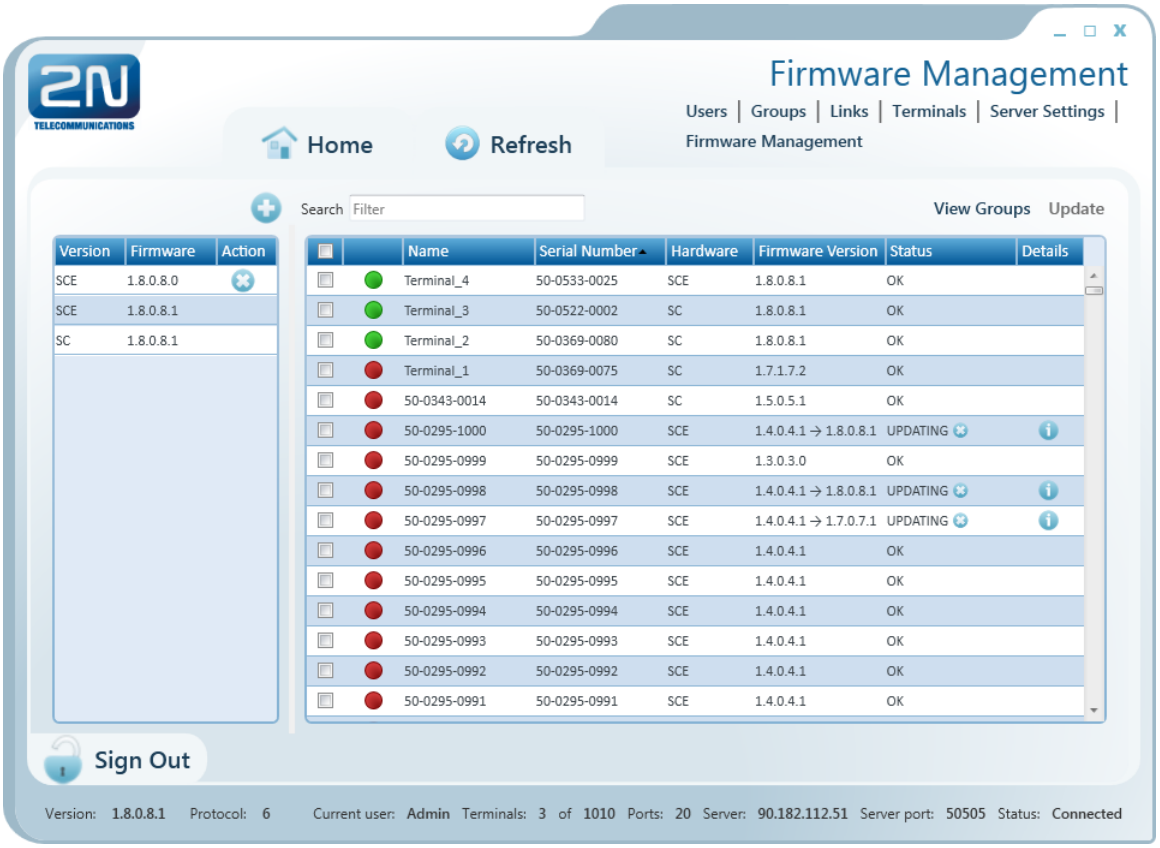


Figure: Firmware Management Menu

The **Firmware Management** menu is used for updating the **2N® SmartCOM** terminal firmware via the **2N® SmartCOM** Server. The user selects a firmware version and ticks off the terminal or group of terminals to be updated. This enables the **Update** but ton. Push the button to execute automatic update for all the selected terminals.

Note

- The terminals that are off–line during the update will be updated as soon as they log in to the **2N® SmartCOM** Server.

There is a list of available FW versions in the left section of the window. Push the **Add** button to add a new firmware version to the list.

Caution

- Just one default firmware version identical with the **2N® SmartCOM** Control Panel FW version is available after a new server installation. Add more firmware versions to the database if necessary.
- If you just upgrade the **2N® SmartCOM Server** keeping the configuration instead of installing a new server, the firmware files will be retained. The firmware list will be identical with the original one plus a new default firmware version.
- If you select a SC or SCE terminal for upgrade, the firmware versions matching these HW types will only be listed to avoid false FW upload.

The right–hand window section displays a table including the list of all configured terminals or terminal groups (View Groups/View Terminals).

View Terminals

The table includes six columns. The checkbox helps select a terminal to be updated. The second column indicates whether the terminal is on–line or off–line. The terminal name, serial number and current firmware versions are available here too. An actual or scheduled upgrade is indicated by 'original FW new FW'. The Status field defines the state of the terminal updating process as follows:

- **OK** – update completed, terminal ready for work.
- **UPDATING** – update in progress.
- **ERROR** – update error.
- **UNKNOWN** – terminal not connected yet (FW version unknown).

View Groups

The table includes only names of terminal groups and offers checkboxes for selection. When you select a group and push **Update**, all the terminals assigned to the selected group will be updated. Go back to **View Terminals** to display the update states of all the terminals.

Caution

- Remember to check off the firmware version and one terminal/terminal group at least to enable the **Update** button. **Otherwise, Update will not be available.**
- Tick off the checkbox in the table header to select all table items, i.e. all available terminals and/or terminal groups.

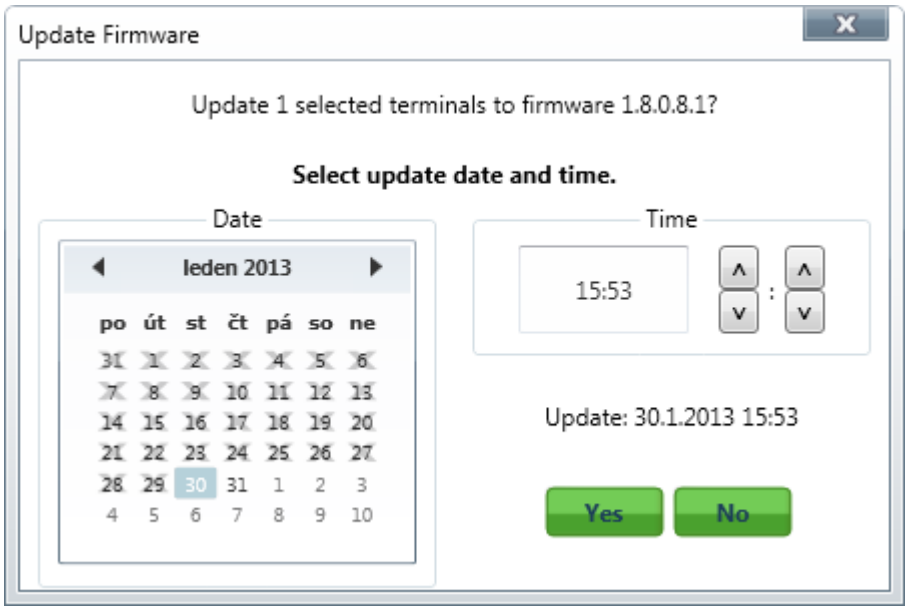


Figure: Update Firmware

Scheduled terminal update

Click on **Update** to open a new window for you to schedule the upgrading date and time for the selected terminals. Push Yes to execute update immediately. As the current system time is running on the server, the updating procedure will start immediately. To execute update later, set the required date and time. The update will start automatically on the selected day and at the selected time.

Note

- There is a server limitation as to the count of terminals for updating. If you want to update more terminals than 10 at the same time, the first 10 terminals will start updating at the specified time, the next 10 terminals will start updating in one minute and so on until all the selected terminals have been updated. The purpose of this limitation is to protect the server stability and keep the required rate.

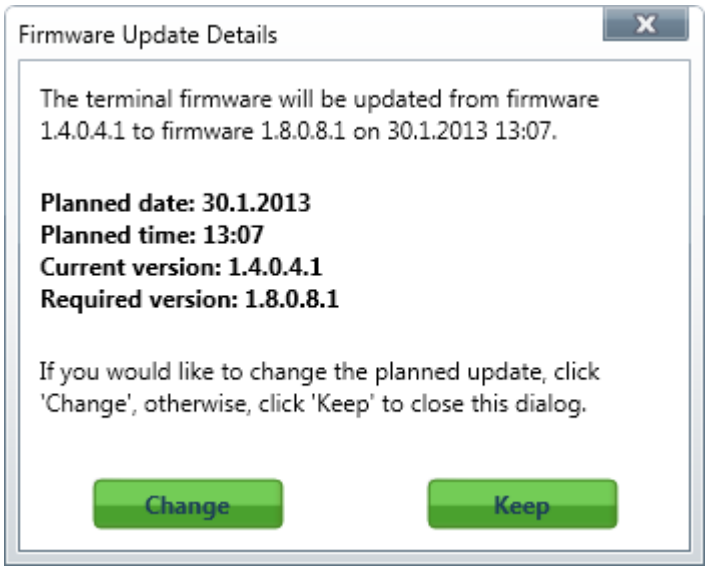


Figure: Firmware Update Details

Push the **Info** button in the **Details** column to open the **Firmware update details**, including the upgrade date. Click on **Change** to re-schedule the upgrade, or push **Keep** to retain the original setting and close the window.

8. AT API

In this section, the **2N® SmartCOM AT API** function is described from the user's point of view.
Here is what you can find in this section:

8.1 AT API Description

The AT API is launched on the **2N® SmartCOM** Server and requires a licence. You have to enable its use in the **2N® SmartCOM** Control Panel. Refer to the figure below for the basic function.

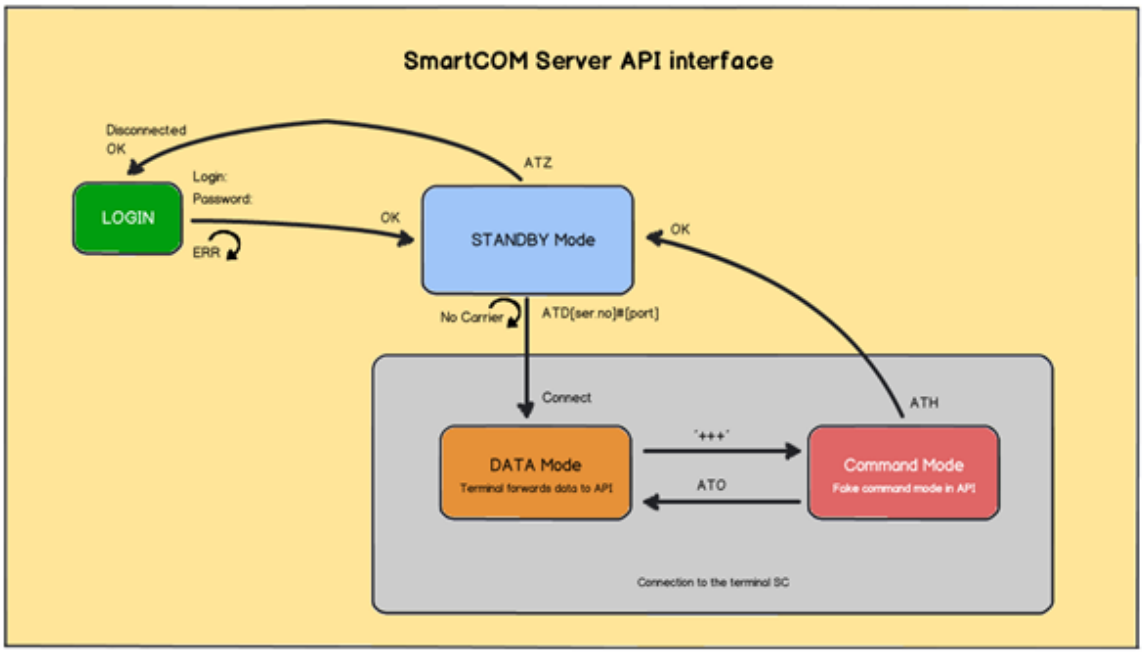


Figure: AT API

AT API Use

Having logged in, get connected via Telnet to the **2N® SmartCOM** Server address on the port selected for the AT API. After connection, you will be asked to enter the user name and password. You can use any login available on the server. The login dialogue looks as follows:

2N® SmartCOM AT API
Login:
Admin
Password:
2n
OK

Now you are in the AT API environment in the standby mode and can enter the supported commands. Enter the **ATZ** command or close the terminal application to log out.

8.2 Supported Commands

This subsection provides all the AT commands that can be used in the AT API command channel including their exact formats and main details.

Basic Commands

Basic commands for the **2N® SmartCOM** AT API.

```
at
```

- Enter the command to check the interface function. No action is executed and the OK reply is always sent.

```
ate
```

- Enter the command to disable echo (to display just replies, not commands).

```
ate0
```

- Enter the command to disable echo.

```
ate1
```

- Enter the command to enable echo.

```
ati
```

- Enter the command to display the device model – **2N® SmartCOM** AT API.

```
ati3
```

- Enter the command to display the current server version: x.x.x.x.x

```
ati4
```

- Enter the command to display the serial number of the **2N® SmartCOM** Server.

```
at+cgmi
```

- Enter the command to display the device manufacturer – **2N® Telekomunikace a.s.**

```
at+cgmm
```

- Enter the command to display the device model – **2N® SmartCOM** AT API.

```
at+cgmr
```

- Enter the command to display the current server version: x.x.x.x.x

```
at+gmi
```

- Enter the command to display the device manufacturer – **2N® Telekomunikace a.s.**

```
at+gmm
```

- Enter the command to display the device model – **2N® SmartCOM** AT API.

```
at+gmr
```

- Enter the command to display the current server version: x.x.x.x.x

```
at+gsn
```

- Enter the command to display the GSM module IMEI.

```
atz
```

- Enter the command to log out the current user and terminate the TCP connection.

Server Settings

```
at^sccfg?
```

- Enter the command to read out and display the current server settings.

```
^SCCFG: "LISTEN PORT",50505
^SCCFG: "HTTP PORT",93
^SCCFG: "HTTP ENABLED",1
^SCCFG: "AT API PORT",1562
^SCCFG: "AT API ENABLED",1
^SCCFG: "LOG LEVEL",3
^SCCFG: "MAX USER TCP CONNECTIONS",100
^SCCFG: "MAX TERMINAL TCP CONNECTIONS",100
^SCCFG: "KEEPALIVE TIMEOUT",60
^SCCFG: "KEEPALIVE SENDING PERIOD",180
^SCCFG: "TERMINAL FW URL","http://$(SERVER_IP):93/firmware/1.4.0.4.2.bin"
```

```
at^sccfg="listen_port",1560
```

- Enter the command to set the server listening port to 1560.

```
at^sccfg="http_port",8080
```

- Enter the command to set the web server http port to 8080.

```
at^sccfg="http_enabled",1
```

- Enter the command to enable/disable the use of the http interface: 0 – disabled, 1 – enabled.

```
at^sccfg="at_port",1562
```

- Enter the command to set the AT API port to 1562.

```
at^sccfg="server_restart"
```

- Enter the command to restart the **2N® SmartCOM** Server.

Caution

- All the above parameters are saved into the server database but will not become effective until the new database is loaded into the server memory after restart.

Terminal Connection

```
atd<ser_no>#<port>
```

- Enter the command to establish connection to the selected terminal and selected port.

Note

- Suppose you want to establish connection to terminal 50–0295–0562 and its RS 232 port. Enter the following command into the API:

```
ATD5002950562#1
```

```
+++
```

- Enter the command to switch on the command mode for you to enter the basic AT commands for server information and the **ATH** command for connection termination.

```
ato
```

- Enter the command to switch back to the data mode.

```
ath
```

- Enter the command to terminate connection with the currently connected terminal without leaving the API environment. You can go on entering commands and establish new connections.

Terminal Communication

```
at^scstate<ser_no>
```

- Enter the command to know the terminal state. The reply is as follows:

```
Terminal state:
imei: 355915030753263
operator name: T-Mobile CZ (23001)
signal: 21
iccid: 8942001105088009270
imsi: 230015001013627
terminal serial number: 50-0369-0075
terminal firmware: 1.4.0.4.0
module firmware: L23_00gg.WISMO228 140711
module manufacturer: WAVECOM MODEM
module type: WISMO228
```

```
at^screl<ser_no>#<relay>?
```

- Enter the command to know the state of the relay on the selected terminal.

```
at^screl<ser_no>#<relay>=<state>
```

- Enter the command to set the relay contact position.

```
at^screl<ser_no>#<relay>=<state>,<state_after_term_restart>
```

- Enter the command to set the relay contact position and define the contact behaviour after the terminal restart.

```
at^scdin<ser_no>#<input>="get_value"
```

- Enter the command to read the value from the digital input.

```
at^scadc<ser_no>#<input>="get_value"
```

- Enter the command to read the value from the analogue input.

Port Settings

```
at^scport<ser_no>#<port>?
```

- Enter the command to know the current port configuration. The reply is as follows:

```
^SCPORT1, "BAUDRATE",115200
^SCPORT1, "DATA BITS",8
^SCPORT1, "PARITY",0
^SCPORT1, "STOP BITS",1
^SCPORT1, "FLOWCONTROL",0
```

```
at^scport<ser_no>#[port]=<BAR>,<DB>,<P>,<SB>,<FC>
```

- Enter the command to set the selected port configuration. Enter the parameters in a sequence. The setting options are as follows:

```
BAR – "BAUDRATE",110–230400
DB – "DATA_BITS",5–8
P – "PARITY",0–4
SB – "STOP_BITS",1–2
FC – "FLOWCONTROL",0–1
```

Caution

- You can enter all the port parameters or omit them sequentially from the last one. This means that to change the communication baud rate only, enter the following:

```
at^scport5002961583#1=57600
```

- To set all the port parameters at once, send the following command:

```
at^scport5002961583#1=57600,5,0,1,0
```

Access to Terminal Configuration Port

Configure the terminal via AT API in the same manner as if you configured the terminal via the RS232 port or TCP port 10000 in the Standalone mode. The configuration port is accessible under number zero. Enter the ATD command as if you accessed the terminal physical ports. Upon connection, you can set even the functions that are inaccessible via the Control Panel or AT API commands such as the user–defined functions (UDF) described below.

Note

- Therefore, to configure terminal No. 50–0295–0562, enter the following command into API:

```
ATD5002950562#0.
```

Terminal Data Reading

An additional virtual port No. 100 has been created for reading data, Wireless M–Bus meter readings, e.g., from a terminal. Getting connected to this port, you can access the terminal data reading commands.

```
atd<ser_no>#100
```

- Enter the command to establish connection with the terminal for data access.

Note

- Therefore, to read data from terminal No. 50–0295–0562, enter one of the following commands into API:

```
ATD5002950562#100.
```

When you receive the CONNECT reply, the following commands will become available.

```
at^scwmbus="get_oldest"
```

- Enter the command to write out the oldest record from the Wireless M–Bus meter data space. Example of reply:

```
^SCWMBUS: /<timestamp>,<id>,<rssi>,<len>,"<binary data in hexadecimal format>"
```

Meaning of parameters:

- timestamp – record receiving time (UNIX timestamp)
- id – record code in circular buffer
- rssi – signal intensity in dBm during message receiving
- len – received message length in bytes

```
at^scwmbus="del_oldest"
```

- Enter the command to delete the oldest record from the Wireless M–Bus meter data space. Delete the oldest record and enter the 'get_oldest' command to read the oldest but one record.

```
at^scwmbus="del_all"
```

- Enter the command to delete all records from the Wireless M–Bus meter data space.

Firmware Management

Enter the command to control and set terminal upgrades.

```
at^scupg<ser_no>?
```

- The current upgrade state reply is received.

```
at^scupg<ser_no>="<version>"[,<timestamp>]
```

- The FW version and timestamp are set for the terminal upgrade.

Note

- Enter time as UNIX TIME. Enter 1357055424 for 1.1.2013 15:50:24.

```
at^scupg<ser_no>="CANCEL"
```

- Enter the command to cancel the terminal upgrade.

User, Group and Terminal Management

These commands help you set, edit and delete users, groups and terminals. Log in as a user with administrator rights for this purpose.

> **Note**
> - If the logged in user has no Admin rights, the users, group and terminals that are accessible to such user will only be displayed.
> - The user without the Admin rights is not allowed to add, edit or delete the objects.

```
at^scuser?
```

- Enter the command to return the list of all SC Server users.

```
at^scuser="add","<login>","<full_name>","<password>",<user_flags>
[,"<description>"]
```

- Enter the command to add a user to the database.

```
at^scuser="edit",<user_id>,"<login>","<full_name>","<password>",<user_flags>[,"<description>"
```

- Enter the command to edit a user with the selected User ID. Always enter all parameters.

```
at^scuser="remove",<user_id>
```

- Enter the command to delete a user with the selected User ID.

```
at^scgroup?
```

- Enter the command to return the list of all SC Server groups.

```
at^scgroup="add","<name>"[,"<description>"]
```

- Enter the command to add a group to the database.

```
at^scgroup="edit",<group_id>,"<name>"[,"<description>"]
```

- Enter the command to edit a group with the selected Group ID. Always enter all parameters.

```
at^scgroup="remove",<group_id>
```

- Enter the command to delete a group with the selected Group ID.

```
at^scterminal?
```

- Enter the command to return the list of all SC Server terminals.

```
at^scterminal="add","<name>","<serial_number>","<password>" ,"<description>"]
```

- Enter the command to add a terminal to the database.

```
at^scterminal="edit",<terminal_id>,"<name>","<serial_number>","<password>"[,"<description>"]
```

- Enter the command to edit a terminal with the selected Terminal ID. Always enter all parameters.

```
at^scterminal="remove",<terminal_id>
```

- Enter the command to delete a terminal with the selected Terminal ID.

URC

URC (Unsolicited Result Codes) notifies state changes of the following objects: users, terminals and connections.

```
at^scind?
```

- Enter the command to write out to which URC the user is logged in.

```
at^scind="<type>",<value>
```

- Enter the command to log in/out the user to/from URC.
  - <type> select the URC type (user / terminal / connection / all)
  - <value> 0 = disabled / 1 = enabled

Note

- To log in to the terminal URC, enter the following command into AT API: **at^scind="terminal",1**

URC format

- user connection state change (like in response to at^scuser?): ^SCUSER: <user_id>, "<login>", "<full_name>", "<user_flags>", "<connection_state>", "<description>"
- terminal connection state change (like in response to at^scterminal?): ^SCTERMINAL: <terminal_id>, "<name>", "<serial_number>", "<connection_state>", "<description>"
- connection state change at terminal port: ^SCLINK: <link_id>, "<terminal_name>", "<serial_number>", "<port_name>", "<user_name>", "<connection_state>"

9. User Defined Functions - UDF

This section describes the function of the **2N® SmartCOM** terminal user settings called **User Defined Functions (UDF).**
Here is what you can find in this section:

9.1 UDF Description

UDF provides a user–defined set of conditions for the terminal that are necessary for execution of the set actions. The conditions must be met to make it possible to send SMS/ TCP messages or set the relay position on the given terminal.
Up to 10 UDF conditions can be set for a terminal.
Each condition is evaluated continuously and, if **True**, the defined action will be executed. For re–execution, the condition must meet the **False** status or remain in the set status for a timer–defined period. Thus, SMS will not be sent at every iteration.

Caution

- Follow the general programming principles while creating the conditions to avoid nonsensical syntaxes and/or repetition of identical conditions. Such meaningless statuses cannot be processed effectively due to a limited memory and power capacities of the terminal.

Set the conditions using the AT commands in the terminal configuration. Each AT command must include the condition syntax (<parameter1>sign<parameter2>) followed by the separator ':', action type and action parameters.
A typical AT commands looks as follows:

```
AT^SCUDF="ADD","AIN1>=50:SMS P[+420123456789]m[alarm1] t[60]"
```

Caution

- Make sure that each command includes the condition (syntax), separator (:) and action to be executed("**<syntax>:<action>"** to avoid command setting error.

Caution

- The maximum length of an AT command is 80 characters.

Note

- Any error occurring during condition saving is signalled by the ERROR message and identified by a code if necessary. Refer to the **Error Codes** subsection below for the list of available messages.

9.2 UDF Condition Setting

This subsection provides all the AT commands and parameters that can be used for setting of UDF conditions. The basic commands are described first and then their parts are explained.

Basic AT Commands

These are the basic commands for the **2N® SmartCOM** UDF.

```
AT^SCUDF="ADD",""
```

- The "ADD" command adds a condition to the list of conditions. The command section marked as the code is the condition itself. The terminal replies OK after saving.

Caution

- When the OK message is received, the condition will be listed and available for work. Therefore, mind that an SMS or TCP message can be sent or the relay can be activated immediately.

```
AT^SCUDF="CLEAR"
```

- Enter the command to clear all conditions from the terminal memory.

```
AT^SCUDF="REMOVE",
```

- Enter the command to clear the condition with the selected ID.

```
AT^SCUDF?
```

- Enter the command to list all the conditions saved.

```
AT^SCUDF=?
```

- Enter the command to display the setting options.

```
^SCUDF: "ADD","0-100" ^SCUDF: "REMOVE",1-10 ^SCUDF: "CLEAR"
```

Supported Syntaxes

The condition parameters can be entered in variable ways. For universality, each of the parameters can be a digit, i.e. an analogue input value or a binary input (0–1). Set a specified syntax to select one of the available setting options.
The UDF can work with the following parameters:

<paramX>	Description
AIN1	Analogue input 1
AIN2	Analogue input 2
DIN1	Digital input 1
DIN2	Digital input 2
PUL1	Pulse input 1
PUL2	Pulse input 2
CONx	Reference condition where x = condition <id>
CNTx	Internal counter, where x = counter <id> (1 - 5)
Constant	Value to be used for comparison with paramX
NFG	Network Fail GSM

Caution

- The parameters that are listed as digits, i.e. **AIN** and **PUL**, which may be 0 – 100, or 0 – 4294967295, are converted to logic values as follows: if their value is **0**, their state will be **0**.
- Make sure that **SC PING** is set to make the **NFG** syntax evaluate connection states correctly.

The following operators can be used for evaluation:

<operator>	Description
>	param1 is greater than param2
<	param1 is smaller than param2
==	param1 is equal to param2
>=	param1 is greater than or equal to param2
<=	param1 is smaller than or equal to param2
&&	Conjunction
||	Disjunction
!	Negation

Use the standard syntax, i.e. **<param1><operator><param2>**, to compare the measured value. However, you can just write **<param1>.** If you omit the operator and enter one parameter only, the parameter is automatically considered as logic even with **AIN** and **PUL**. When this parameter becomes effective, the set action will be executed.

Let us show you some syntax examples now.

AIN1>50 – the syntax will be marked true in case the value measured on AIN1 is higher than 50.
PUL2==2596 – the syntax will be marked true in case the value measured on the PUL2 counter is equal to the constant.
DIN1&&CON3 – the syntax will be marked true in case the DIN1 value is true and the reference condition is also true.
!AIN2 – the syntax will be marked true in case any value higher than 0 is measured on the input.
AIN1<=AIN2 – the syntax will be marked true in case the value measured on AIN1 is lower than the value measured on AIN2.

NFG - the syntax will be marked true (i.e. network failure) in case PING failed or the IP address was not obtained during the time set at at^scping="interval",<minutes>. When the IP address is obtained, the state will be cancelled and the condition will become FALSE.

Caution
- If you use Negation, the parameter will be treated as a digital input! It cannot be expected, for example, that if 50 is measured on AIN1, -50 can be obtained after negation.
- To match two inputs use the absolute values obtained from the converter (ADC 0 - 1020). Therefore, make sure that the two inputs have been calibrated properly.

Action Types

Insert an action after the separator for the selected syntax.
SAVE
Enter SAVE to save the condition result into the terminal memory for later use.

Note
- A typical condition saving AT command looks as follows:

```
At^scudf="add","AIN1>50:SAVE"
```

REL1
The action controls the relay 1 state.
REL2
The action controls the relay 2 state.

Note
- A typical relay switching AT command looks as follows:

```
At^scudf="add","AIN1>50:REL1 r[1]"
```

SMS

Enter SMS to send the defined SMS to the defined telephone number.

Note

- A typical SMS sending AT command looks as follows:

```
At^scudf="add","AIN1>50:SMS p[+420123456789] m[text 1]"
```

Caution

- Make sure that the telephone number and message parameters are completed to set this function successfully.

TCP

Enter TCP to send the defined TCP message to the defined IP address and port.
Use telnet for TCP sending.

Note

- A typical TCP sending AT command looks as follows:

```
At^scudf="add","AIN1>50:TCP i[62.134.22.87:8026] m[text 1]"
```

Caution

- Make sure that the telephone number and message parameters are completed to set this function successfully.

Warning

- Make sure that the TCP receiving server exists to avoid process slow–down due to the terminal waiting for the reply from a non–existent server and not executing new actions.

CNT 1-5

Enter CNT 1-5 to control all of the 5 internal counters.

Note

- The AT command for counter increment by 1 can be as follows, for example:

```
At^scudf="add","AIN1>50:CNT1 d[1]"
```

Action Parameters

Use the parameters of the actions mentioned above to change the relay states and set the address for SMS/TCP sending. Enter the parameters in the format <mark>[value] and separate them with a space on both ends. There is no specified order for the parameters.

IP address

Set the IP address **i[xxx.xxx.xxx.xxx]** and default port 80 for the TCP messages. To change the port, enter **i[xxx.xxx.xxx.xxx:yyyyy]**, where **x** is the IP address of the remote server and **y** is the port to be used for TCP sending.

> **Caution**
> - Enter the IP address for the **TCP** action only as it is meaningless and signalled as error for the other actions.

Telephone number

Set the telephone number **p[xx]**, where **xx** is the telephone number in the national or international format. Hence, enter **p[123456789]** or **p[+420123456789].**

> **Caution**
> - The telephone number can be used for the **SMS** action only.
> - Enter telephone numbers consisting of 1 – 15 characters into the parameter.

Relay state

Set the relay contact position **r[1** or **0]**.
1 means that the relay is closed and **0** means that the relay is open.

> **Caution**
> - The **r** parameter can be used for the **REL** action only.

Timer

Set the timer **t[xx]** in seconds, where **xx** is the waiting time. Refer to the **Timer** subse ction for details.

> **Caution**
> - The timer can be used for the **TCP** and **SMS** actions only.

Message

Set the message **m[text]**. The maximum message length is 40 characters. Longer messages will be rejected.

> **Note**
> - The maximum of 40 characters is derived from the maximum length of the SMS to be sent. If the maximum **PUL** key values are used, the length is 160 characters.

Caution

- The message can be used for the **TCP** and **SMS** actions only.

You can also insert the following keys into the message parameter to show the value currently measured on the input circuits or the current logic value of the conditions in the SMS.

Key	Description
$AIN1	Analogue input 1 value
$AIN2	Analogue input 2 value
$DIN1	Digital input 1 value
$DIN2	Digital input 2 value
$PUL1	Pulse input 1 value
$PUL2	Pulse input 2 value
$CNT1	Counter 1 value
$CNTx	Counter x value (1-5)
$CON1	Condition 1 result value 1
$CONx	Condition x result value (1-10)

Let us show you an example for illustration.
Suppose you want to enter a command into the terminal, which, when the limit value 80 on input 1 is exceeded, will send an SMS to number 123456789 including the **ALARM value is:** (the currently measured value).
The AT command looks as follows:

```
AT^SCUDF="ADD","AIN1>80:SMS p[123456789] m[ALARM value is:$AIN1]"
```

The following SMS will be sent to the set number:

```
ALARM value is:87
```

Caution

- Should you enter an invalid or incomplete key, the key will not be included in the SMS sent.

Tip

- Enter a special key $$ to display the $ character in the SMS as the single $ character introduces other keys.

Timers

There are three ways how to make use of condition timing. See below.

Timer not set

The action is executed when the condition is evaluated as true. For re–execution, the condition must be false and then true again.

Timer

Set the **t[60]** string, where **t** identifies a timer. Number **60** is the timer delay in seconds. The timer setting options are 5 – 4294967s.

The action is executed when the condition is evaluated as true. For re–execution, the condition must be false and then true again, and the set timeout must be over.

Continuous timer

Set the **t[c120]** string, where **t** identifies a timer, **c** indicates a continuous timer and number **120** is the timer delay in seconds. The timer setting options are 5 – 4294967s.

The action is executed when the condition is evaluated as true. The action is re–executed after the timeout if the condition is true. The condition need not be evaluated as false before re–execution.

Counters

There 5 virtual counters altogether in the terminal program for counting actions or storing current values for later computation. The following two parameters are used for control:

Counter incrementing

Enter string **d[1].** The '**d**' parameter defines that the counter value increases by the value included in the brackets (one step). You can enter 1, 5, 254, etc. and also negative values, which will be subtracted from the set value.

Counter setting

Enter string **s[4658].** The '**s**' parameter defines the counter setting value and number **4658** sets the counter value.

Error Codes

This table includes the error codes you can use for UDF setting. An incorrect command is signalled by ERROR <err_code>. The table helps you identify the type of error.

<err_code>	Name	Description
1	UDF_RESP_ERROR	General error
2	UDF_RESP_ERROR_NO_FREE_SLOT	No space for new record
3	UDF_RESP_ERROR_SYNTAX_ACTION_SEPARATOR	Separator ':' not found

4	UDF_RESP_ERROR_SYNTAX_LOGIC_MARK	Logic mark not found or wrong
5	UDF_RESP_ERROR_SYNTAX_PARAM1	Condition parameter 1 not found or wrong
6	UDF_RESP_ERROR_SYNTAX_PARAM2	Condition parameter 2 not found or wrong
7	UDF_RESP_ERROR_SYNTAX_INVALID_CONDITION	Condition not supported
8	UDF_RESP_ERROR_SYNTAX_ACTION	Action syntax error
9	UDF_RESP_ERROR_SYNTAX_ACTION_TYPE	Action type not supported
10	UDF_RESP_ERROR_PHONE_NUMBER_LEN	Telephone number length error
11	UDF_RESP_ERROR_PHONE_NUMBER	Telephone number not found or not supported
12	UDF_RESP_ERROR_IP_ADDRESS	IP address not found or not supported
13	UDF_RESP_ERROR_IP_PORT	IP port wrong
14	UDF_RESP_ERROR_RELAY_STATE	Relay state not found or not supported
15	UDF_RESP_ERROR_PARAM_PARSE	Action parameter translation error
16	UDF_RESP_ERROR_PARAM_MARK	Unknown action parameter type
17	UDF_RESP_ERROR_PARAM_MARK_TIMING_PERIOD	Timing period wrong or beyond limits
18	UDF_RESP_ERROR_PARAM_MESSAGE_LENGTH	Message length error

19	UDF_RESP_ERROR_ID_NOT_FOUND	Reference condition ID not found
20	UDF_RESP_ERROR_PARAM_TYPE_INVALID	Action parameter not supported for selected action type
21	UDF_RESP_ERROR_ACTION_IN_PROGRESS	Condition action in progress
22	UDF_RESP_ERROR_MESSAGE_MISSING	Message to be sent not found
23	UDF_RESP_ERROR_PARAM_VALUE	Value format or range is invalid

10. sc_config

sc_config is an administrator program launched in the **2N® SmartCOM** Server control row. This application can help you configure all the server parameters: start/stop the server or export/import the server database.

Caution

- Use this program to export and import databases safely.
- You are not advised to copy the sc_config.db database files between servers to avoid data loss.

Tip

- The application is launched in the command row. The common path to the program is identical for all WINDOWS XP, Vista and 7 versions:
- **c:\Program Files\2N® TELEKOMUNIKACE\2N® SmartCOM\SC Server\sc_config.exe**

If sc_config.exe is launched without any parameter, the program will list all available information on the server. A typical listing looks as follows:

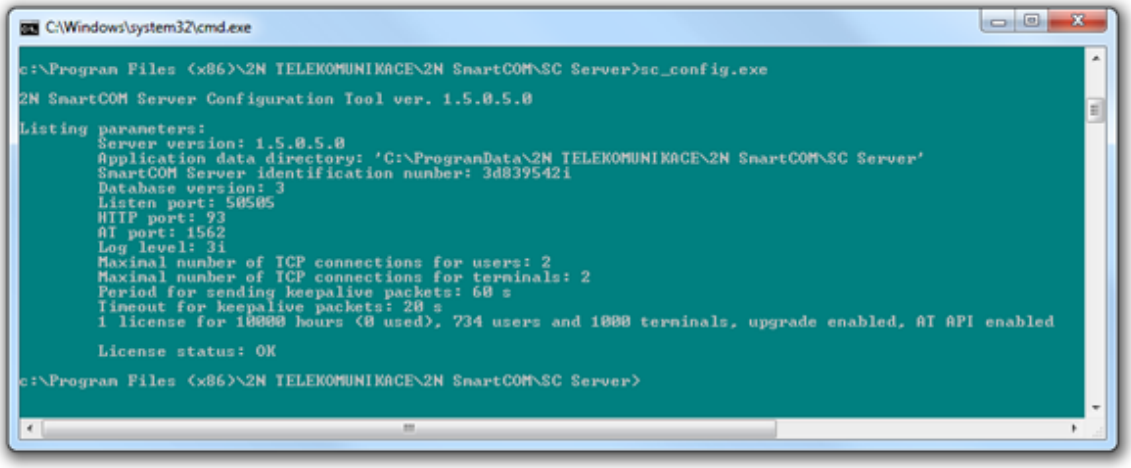


Figure: sc_config.exe

Database Export and Import

You can export the database under normal operation. When the program is launched, a copy of the current database is generated for export purposes so that the database cannot be changed during export.
Launch sc_config with the –cExportDatabase parameter to initiate exporting.

The command will look as follows:

C:\Program Files\2N® TELEKOMUNIKACE\2N® SmartCOM\SC Server\sc_config.exe –cExportDatabase

The program will create a new file called, e.g., db–20120221095921–export.xml. The number in the filename includes the current database export date and time in the YYYYMMDDhhmmss format.

The database is saved into the user data folder and so can be different for different systems.

Note

- A typical storage for WINDOWS XP is C:\Documents and Settings\All Users\Application Data**2N® TELEKOMUNIKACE\2N® SmartCOM** \SC Server\db–20120221095921–export.xml.
- A typical storage for WINDOWS Vista and 7 is C:\ProgramData**2N® TELEKOMUNIKACE\2N® SmartCOM**\SC Server\db–20120221095921–export.xml.

You may import the database with the server switched off only. If the server is

running, the database cannot be imported and the program signals an error. Stop the server using the following command:

C:\Program Files\2N® TELEKOMUNIKACE\2N® SmartCOM\SC Server\sc_config.exe –cStopServer

To import the database, enter the –cImportDatabase parameter and set the absolute path to the file.

C:\Program Files\2N® TELEKOMUNIKACE\2N® SmartCOM\SC Server\sc_config.exe –cImportDatabase "C:\ProgramData\2N® TELEKOMUNIKACE\2N® SmartCOM\SC Server\db–20120221095921–export.xml"

When you enter this command, all the database tables will be imported one after another. A successful import of each table is always confirmed after completion.

Caution

- The path to the file with the exported database must always be given in brackets as if no path is found, the current database will be deleted and replaced with a new blank one.

Note

- If the database contains a high number of users and terminals, the import of tables will take a rather long time, typically a few minutes.

Restart the server upon successful import. Enter the following command:

C:\Program Files\2N® TELEKOMUNIKACE\2N® SmartCOM\SC Server\sc_config.exe –cStartServer

Setting Options

The sc_config program offers further server parameter settings. See below for the long list.

Tip

- These parameters are set as program parameters, i.e. program name<space>program parameter.

General commands

–l

- Enter this command to list all the parameters.

```
--help or –h
```

- Enter this command to print out this help with the list of commands.

```
--version or -V
```

- Enter this command to print out the program version.

```
-d
```

- Set data directory of the server.

Parameter get commands

```
–gListenPort
```

- Enter this command to print out the listen port (port for the **2N® SmartCOM** protocol).

```
–gHttpPort
```

- Enter this command to print out the HTTP port.

```
–gAtPort
```

- Enter this command to print out the AT API port.

```
–gTerminalPV1url
```

- URL for update of terminals with the **2N® SmartCOM** protocol version 1 (the oldest ones).

```
-gEncryptionKey
```

- Print packet encryption key.

```
-gEncryptionMode
```

- Print packet encryption mode (0: disabled, 1: optional, 2: forced).

Parameter set commands

```
–sListenPort
```

- Enter this command to set the listen port (port for the **2N® SmartCOM** protocol).

```
–sHttpPort
```

- Enter this command to set the HTTP port.

```
–sAtPort
```

- Enter this command to set the port for AT API.

```
-sLogLevel
```

- Enter this command to set the level for logs. (1 – 5)

```
-sMaxUser
```

- Enter this command to set the maximum number of users connected to the server at the same time. The maximum value for the parameter is given by the licence.

```
-sMaxTerm
```

- Enter this command to set the maximum number of terminals connected to the server at the same time. The maximum value for the parameter is given by the licence.

```
-sKeepAliveTimeout
```

- Enter this command to set the timeout for the client (user/terminal) to answer the periodical KeepAlive packet in order not to be disconnected. Select a higher value if a high number of terminals (100+) are used to avoid disconnection.

```
-sKeepAlivePeriod
```

- Enter this command to set the interval between the KeepAlive packets. This number should be higher than the KEEP_ALIVE_TIMEOUT.

```
-sResetAdmin
```

- Enter this command to reset the Admin user password to '2n'.

```
-sTerminalPV1url
```

- Sets URL for update of terminals with the SmartCOM protocol version 1 (the oldest ones). Use parameter '-reset' to reset URL to the default value (' http://star.2n.cz/~fejfar/SC_1-3-1-3-2.bin').

```
-sEncryptionKey
```

- Set packet encryption key. 32 hexa characters.

```
-sEncryptionMode
```

- Set packet encryption mode (0: disabled, 1: optional, 2: forced).

Server commands

```
-cStartServer
```

- Enter the command to start the **2N® SmartCOM** Server service.

```
-cStopServer
```

- Enter the command to stop the **2N® SmartCOM** Server service.

```
-cRestartServer
```

- Enter the command to restart the **2N® SmartCOM** Server service.

```
-cExportDatabase
```

- Enter the command to export the **2N® SmartCOM** Server database to an XML file.

```
-cImportDatabase
```

- Enter the command to import the **2N® SmartCOM** Server database from an XML file. If the server is not stopped, the operation will fail.

11. Maintenance

This section describes how to maintain the **2N® SmartCOM** product.
Here is what you can find in this section:

11.1 Firmware Upgrade (Update)

The factory default firmware in **2N® SmartCOM** can be upgraded using the **2N® SmartCOM** Control Panel or an AT command. Contact the **2N® TELEKOMUNIKACE a.s**. Technical Support staff for information on new functions and firmware versions. Enter the following command into the terminal to upgrade firmware.

```
at^scupg="http://$(SERVER_IP):http_port/SmartCOM_SC_v00-04.bin"
```

The command has to include the address of the server for downloading and the exact name of the firmware file.

Caution

- Make sure that **2N® SmartCOM is** connected to the Internet during the whole process of firmware upgrading to avoid firmware installation failure.

11.2 Factory Default Reset

2N® SmartCOM can be factory reset. To do so, loosen the screws and remove the upper part of the case.

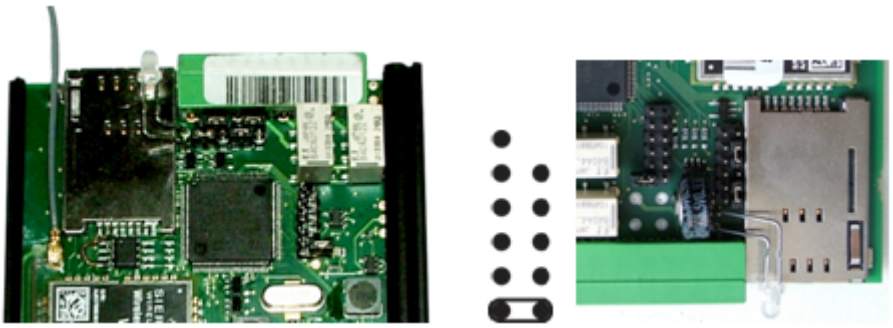


Figure: Factory Reset Jumper

Disconnect **2N® SmartCOM** from the power supply. Connect the jumper as shown in Fig. 11.1 (basic version on the left, PRO version on the right) and reconnect the power supply. Now the Flash memory is deleted and the factory default values are reset for all ports. Remember to remove the jumper to avoid deletion of the factory values upon every start.

11.3 Repairs

Should you need some service interventions, please contact the **2N® TELEKOMUNIKACE a.s.** Technical Support staff via e-mail: techsupport@2n.cz or tel.: (+420)900300300.

2N® SmartCOM repairs may be made by an authorised servicing centre or the manufacturer only.

12. Technical Parameters

This section provides a list of **2N® SmartCOM** technical parameters.

12.1 Technical Parameters for Basic Version

Power Supply

DC power supply	12 V DC
Mains supply	100-240V AC adapter 50-60Hz / 12V DC – 0.5A
Power input	Up to 3W
Connector	DC Jack 2.1mm

GSM

Mobile network type	GSM 850, EGSM 900, DCS1800, PCS 1900
SIM card	Plug-in 3V/1V8 (small)
Transmission power	2W (1W)
Data transmission	GPRS class 10
Receiver sensitivity	-108 dBm

Antenna

Frequency	850/900/1800/1900 MHz
Impedance	50 Ω
Maximum power	2W
Antenna connector type	SMA

Relays (Two)

Maximum voltage	250V AC, 30V DC
Maximum current	2A
Maximum power	30W/62.5VA

Input Circuits to ADC (Two)

Voltage range	0 - 10V DC
Current range	4 – 20 mA / 0 – 20 mA DC

RS232 Interface

Connector	D-Sub 9-pin, male
Transmission rate	110 – 23400 Baud

RS485 or M-Bus Interface (Optional)

Connector	RJ12 6-pin
Count of M-Bus devices	Up to 5

Working Conditions

Temperature	-40°C ÷ 85°C
Relative humidity	0 ÷ 80%

Others

Dimensions (without connectors)	69 x 100 x 24 mm
CE certificate	

12.2 Technical Parameters for PRO Version

Power Supply

DC power supply	5-50 V DC
Power input	Up to 7W
Connector	Terminal block for 1.5mm^2 / 16 AWG wires

GSM

Mobile network type	GSM 850, EGSM 900, DCS1800, PCS 1900
SIM card	Plug-in 3V/1V8 (small)
Transmission power	2W (1W)
Data transmission	GPRS class 10
Receiver sensitivity	-108 dBm

Antenna

Frequency	850/900/1800/1900 MHz
Impedance	50 Ω
Maximum power	2W
Antenna connector type	SMA

Relays (Two)

Maximum voltage	250V AC, 30V DC
Maximum current	2A
Maximum power	30W/62.5VA

Input Interfaces (Two)

Voltage range	0-10V DC
Current range	4 – 20 mA / 0 – 20 mA DC

RS232 Interfaces

Connector	D-Sub 9 pin, male
Baud rate	110 – 230400 Baud

RS485 or M-Bus Interface (Optional)

Connector	Terminal block for 1.5mm^2 / 16 AWG wires
Count of M-Bus devices	Up to 5

Wireless M-Bus (Optional)

Frequency	868-870MHz
Data memory	120kB

Charger

Accumulator type	Gel-lead-acid 6V or 12V (set the parameters before connection)
Charging current	Up to 350 mA

Real Time Clock

Power failure back-up	0.33F super capacitor, 2-day back-up capacity

Working Conditions

Temperature	-40°C ÷ 85°C
Relative humidity	0 ÷ 80%

Others

Dimensions (w/o connectors)	105 x 100 x 30 mm
CE certificate	

13. Supplementary Information

This section provides supplementary information on **2N® SmartCOM**.
Here is what you can find in this section:

13.1 List of Abbreviations

- **APN (**Access Point Name) Name of GPRS access point.
- **CSD (**Circuit Switched Data) Circuit switched data transmission.
- **GSM** (Group Switched Mobile system) Current standard for mobile telephone systems.
- **GPRS (**General Packet Radio Service) High-speed packet oriented mobile data service.
- **HW** (Hardware) For this purpose, hardware means an electronic device, circuit, board, component, etc..
- **PIN** (Personal Identification Number) SIM card protecting code against unauthorised use.
- **PUK** (Personal Unblocking Key) SIM card unblocking code after repeated wrong PIN entering attempts.
- **SIM** (Subscriber Identity Module) Chip module for GSM identification.
- **FW (**Firmware) Software responsible for system function.
- **SW** (Software)

13.2 Regulations, Laws and Directives

Europe

2N® SmartCOM conforms to the following directives and regulations:

Directive 1999/5/EC of the European Parliament and of the Council, of 9 March 1999 – on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity

Directive 2006/95/EC of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits

Directive 2004/108/EC of the Council of 15 December 2004 on the harmonisation of the laws of Member States relating to electromagnetic compatibility

Commission Regulation (EC) No. 1275/2008, of 17 December 2008, implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment

Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment

Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No. 793/93 and Commission Regulation (EC) No. 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC

Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment.

13.3 General Instructions and Cautions

General Instructions and Cautions

- Please read this User Manual carefully before using the product. Follow all instructions and recommendations included herein.
- Any use of the product that is in contradiction with the instructions provided herein may result in malfunction, damage or destruction of the product.
- The manufacturer shall not be liable and responsible for any damage incurred as a result of a use of the product other than that included herein, namely undue application and disobedience of the recommendations and warnings in contradiction herewith.
- Any use or connection of the product other than those included herein shall be considered undue and the manufacturer shall not be liable for any consequences arisen as a result of such misconduct.
- Moreover, the manufacturer shall not be liable for any damage or destruction of the product incurred as a result of misplacement, incompetent installation and/or undue operation and use of the product in contradiction herewith.
- The manufacturer assumes no responsibility for any malfunction, damage or destruction of the product caused by incompetent replacement of parts or due to the use of reproduction parts or components.
- The manufacturer shall not be liable and responsible for any loss or damage incurred as a result of a natural disaster or any other unfavourable natural condition.
- The manufacturer shall not be held liable for any damage of the product arising during the shipping thereof.
- The manufacturer shall not make any warrant with regard to data loss or damage.
- The manufacturer shall not be liable and responsible for any direct or indirect damage incurred as a result of a use of the product in contradiction herewith or a failure of the product due to a use in contradiction herewith.
- All applicable legal regulations concerning the product's installation and use as well as provisions of technical standards on electric installations have to be obeyed. The manufacturer shall not be liable and responsible for damage or destruction of the product or damage incurred by the consumer in case the product is used and handled contrary to the said regulations and provisions.
- The consumer shall, at its own expense, obtain software protection of the product. The manufacturer shall not be held liable and responsible for any damage incurred as a result of the use of deficient or substandard security software.
- The consumer shall, without delay, change the access password for the product after installation. The manufacturer shall not be held liable or responsible for any damage incurred by the consumer in connection with the use of the original password.
- The manufacturer also assumes no responsibility for additional costs incurred by the consumer as a result of making calls using a line with an increased tariff.

Electric Waste and Used Battery Pack Handling

Do not place used electric devices and battery packs into municipal waste containers. An undue disposal thereof might impair the environment!
Deliver your expired electric appliances and battery packs removed from them to dedicated dumpsites or containers or give them back to the dealer or manufacturer for environmental-friendly disposal. The dealer or manufacturer shall take the product back free of charge and without requiring another purchase. Make sure that the devices to be disposed of are complete.
Do not throw battery packs into fire. Battery packs may not be taken into parts or shirt-circuited either.

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