2N® SmartCOM

Wireless Device Management over IP

User Manual

Version	1.3.0
Firmware	1.3.0

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

The product family developed by 2N TELEKOMUNIKACE a.s. includes intercoms, GSM and UMTS products, private branch exchanges (PBXs) and M2M solution.
2N TELEKOMUNIKACE a.s. has been ranked among the Czech top companies for years and represents a symbol of prosperity in the field of IP intercoms. Furthermore, the company dedicates significant attention to operator solutions as well as to effectively providing support for our distribution network and customer service. At present, we export our products into over 120 countries worldwide and have exclusive distributors on all continents.

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2N TELEKOMUNIKACE administers the FAQ database to help you quickly find information and to answer your questions about 2N products and services. On 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 a.s. 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.

2N TELEKOMUNIKACE company is the owner of the ISO 9001:2008 certificate. All development, production and distribution processes of the company are managed by this standard and guarantee high quality, technical level and professional aspect of all our products.

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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:

- Product Description
- Safety Precautions
- Upgrade
- Terms and Symbols Used

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 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**.
1.1.0	■ The User Manual corresponds to 2N® SmartCOM FW version **1.1.0**.
1.3.0	■ The User Manual corresponds to 2N® SmartCOM FW version **1.3.0**.

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

Safety Warning

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

Warning

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

Caution

- **Important information** for system functionality.

Tip

- Useful advice for quick and efficient functionality.

Note

- Routines or advice for efficient use of the device.

AT Command

- AT command stored in the hyper terminal.

text

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.

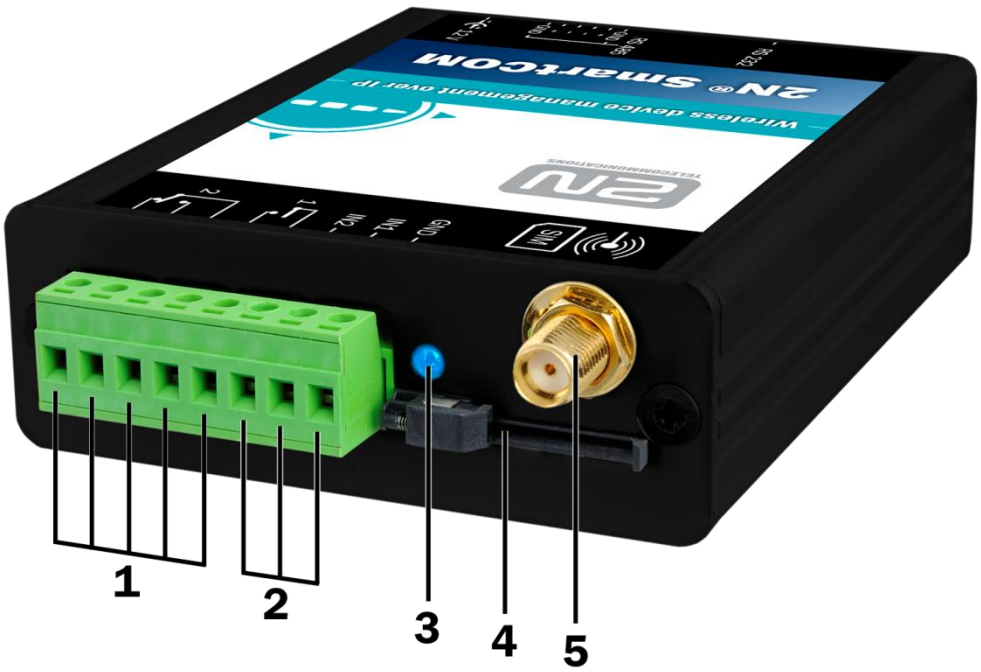
Here is what you can find in this section:

- Product Description
- Before You Start
- Mounting

2.1 Product Description

2N® SmartCOM consists of a board carrying a power supply, RS 485/232 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 unit. Refer to the figures below for description. The whole 2N® SmartCOM system is enclosed in a solid aluminium case.

Figure 2.1
2N® SmartCOM Description (Top View)



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

Figure 2.2 *2N® SmartCOM Connectors (Bottom View)*

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

2.2 Before You Start

Product Completeness Check

Before installing this product, check whether the product delivery includes:

- 1 2N® SmartCOM unit
- 1 GSM antenna
- 1 power adapter
- 1 QuickStart (Quick Guide) manual
- 1 CD including the User Manual and additional information

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.

2.3 Mounting

External Antenna Connection

Screw the enclosed antenna into the SMA antenna connector.

Figure 2.3
Antenna Connection

Caution

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

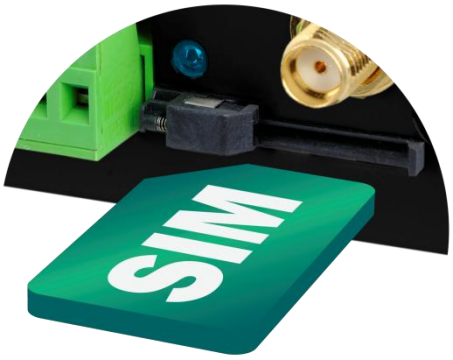
Note

- 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 2.4
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 power connector before connecting your 2N® SmartCOM to an adapter other than that included in the delivery.

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:

- Putting in Operation
- LED Indicator
- Input Circuits
- Output Circuits
- RS 232 Interface
- RS 485 Interface
- Access via IP Ports 10001 and 10002

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 of the superior data concentrator, monitors the events on the RS 232 / 485 interfaces and sends the acquired data to the server via GPRS.

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 disconnect 2N® SmartCOM from the power supply, or send the respective "ATO" AT command.

When your 2N® SmartCOM has been programmed as required, connect the device to the available serial ports RS 232 / 485. Launch the Putty 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.

3.2 LED Indicator

Here the variable statuses of the LED indicator are described.

Figure 3.1

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.

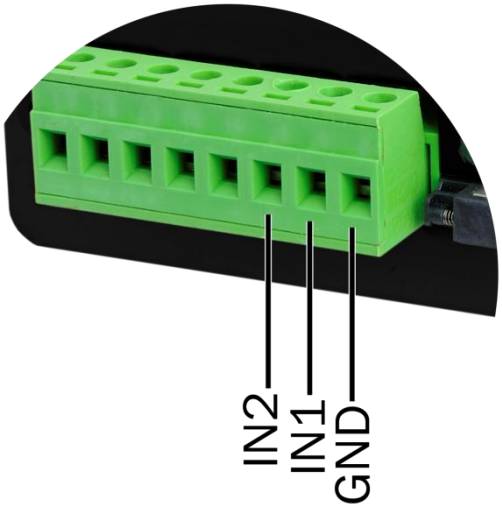
Tip

- 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.

Figure 3.2
Input Terminal Block



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.

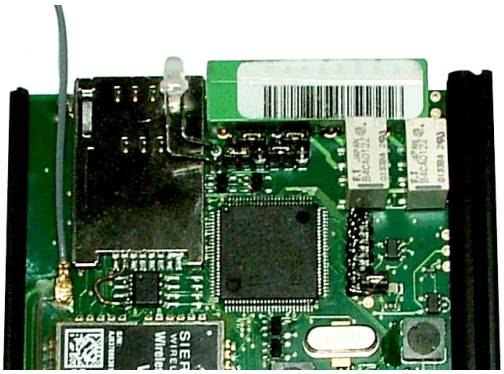
Logical level monitoring

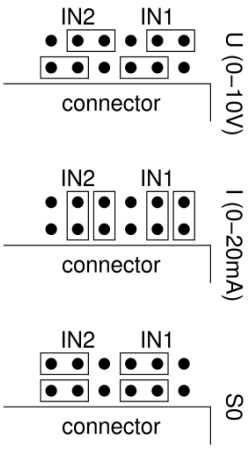
You can monitor the logical levels of voltage and current signals. Use other commands that those intended for classic measurements and define the threshold levels. Again, use the AT commands for reading values on input circuits.

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 3.3

Jumper Setting



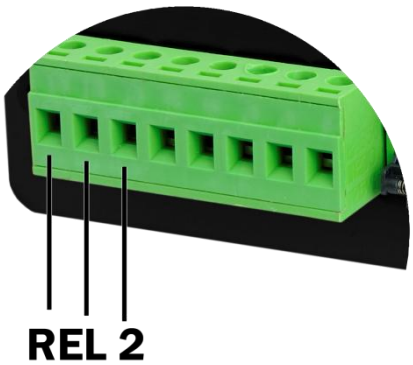


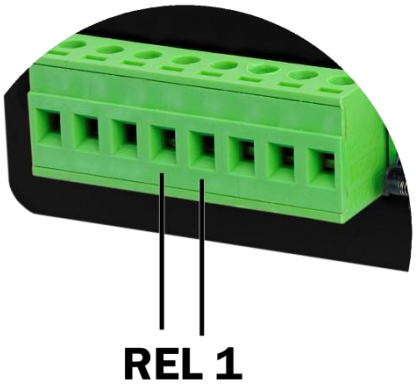
Output Circuits

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.

Figure 3.4

Output Terminal Block





You can control the relay outputs with the AT commands from the CMD mode of the RS 232 interface or via a remote GPRS connection to the SIM card IP address. Refer to Subs. 4.2. for details.

Note

- **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.

RS 232 and RS 485 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 for RS 485. 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 retransmitting all RS 485 events to GPRS.

4 2N® SmartCOM 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:

- Configuration via RS 232
- Configuration via IP
- List of Supported AT Commands

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 the following command:

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

2N® SmartCOM will send you the IP address as negotiated with the provider. 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.

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:
  - Mode 1 TCPCLIENT - 2N® SmartCOM connects and retransmits data from its ports to the selected server.
  - Mode 2 UDPCLIENT – not implemented yet.
  - Mode 3 STANDALONE - 2N® SmartCOM works as a server to which clients get connected (transparent TCP – serial port transmission).

Tip

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

at^sccfg="mode","tcpclient"

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="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) SC Commands

These commands are used for setting the RS 485 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="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="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="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="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.

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^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^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"

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^scfres

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

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.

5 2N® SmartCOM Configuration by SMS

In this section we describe the **2N® SmartCOM** configuration using the Short Message Service **(SMS)**.

Here is what you can find in this section:

- INFO SMS
- Basic Parameters
- Error Buffer
- Relay Output Handling
- IP Access Restriction
- Error Messages

5.1 SMS Configuration

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> 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 default value is 'password'.
- **<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 default value is 'password'. 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

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.

Send the following SMS:

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 default value is 'password'. 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 2N® SmartCOM Terminal Config

In this section, the **2N® SmartCOM** configuration is described.

Here is what you can find in this section:

- Application Description
- Application Use

The 2N® SmartCOM Terminal Config application is used for basic terminal setting. The application environment and basic functions will be described. Launch the application from the directory into which you have installed it.

6.1 2N® SmartCOM Terminal Config

Application Description

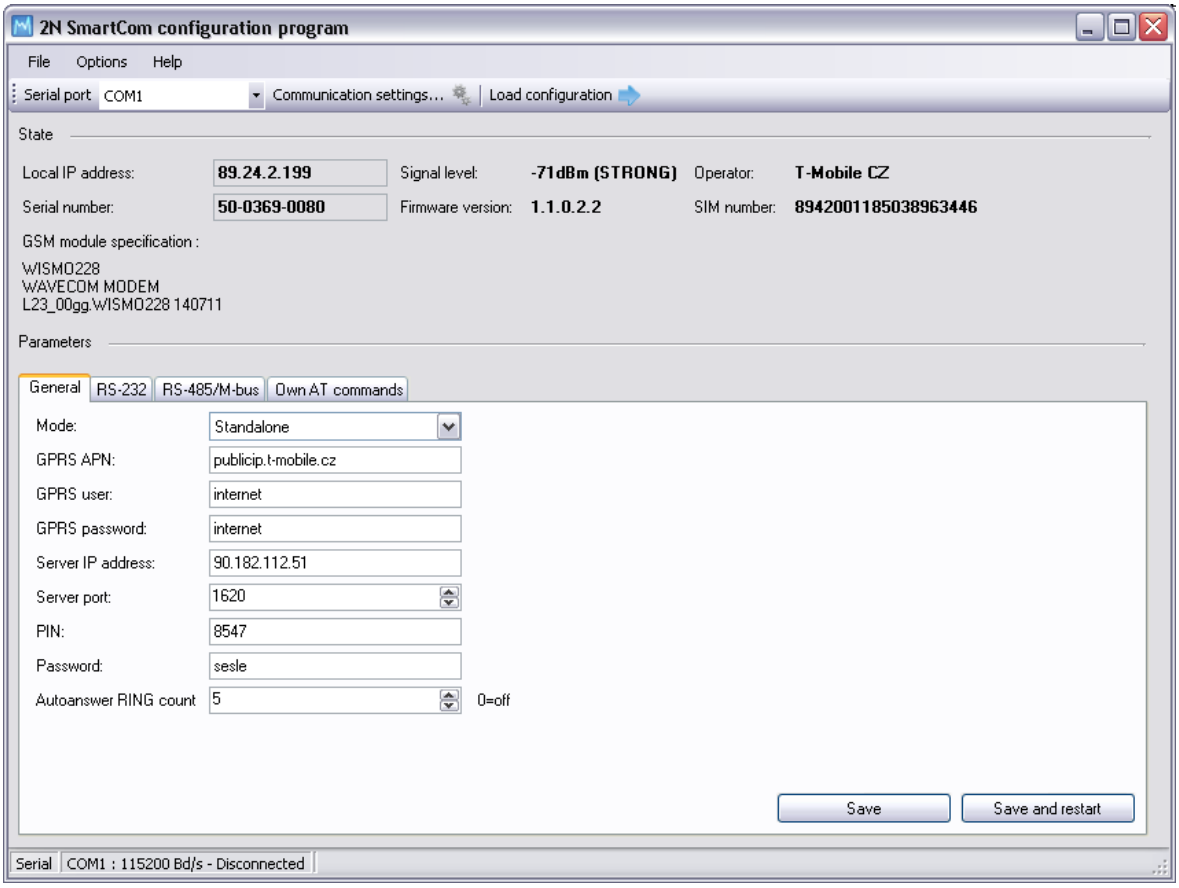


Figure 6.1
2N® SmartCOM Terminal Config Window

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

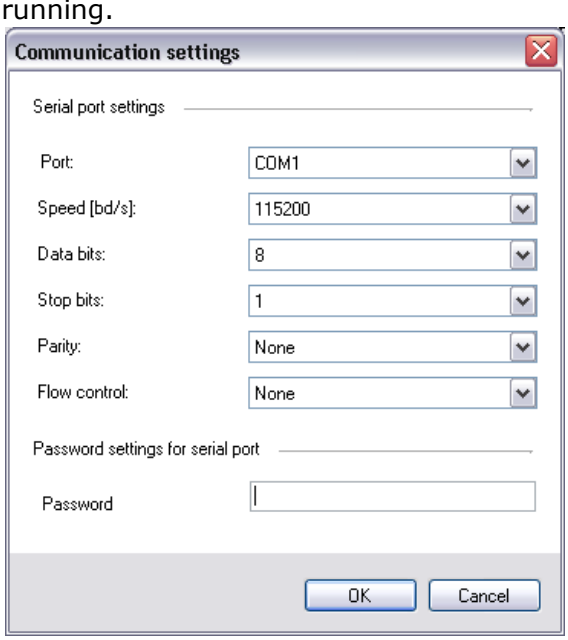


Figure 6.2
Communication Settings

Having selected a port, use the **Communication settings** to adjust the communication speed and define signal transmission for the serial port. The 2N® SmartCOM factory values are set here by default. Refer to Fig. 5.2.

No password is requested by default for the RS 232 port and so nothing is 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 **Upload configuration** button helps the application read out all necessary information from the terminal.

The **Status** item displays the most relevant information of the given device, including the IP address, serial number, firmware version, network provider and signal strength. 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.

This menu also includes information on the **GSM module**: module type, manufacturer and firmware version.

Use the **Parameters** item to view and set parameters for the 2N® SmartCOM terminals. Refer to the **Application Use** subsection below.

The main program menu provides you with **File** to read configuration or quit the application, **Setting** to modify the communication parameters or change the default application language (CZ, EN) and **Help** to get details on the Terminal Config version and manufacturer.

Application Use

Having uploaded configuration, go to the **Basic** tag of the **Parameters** menu.

Set all parameters that you need in this tag. You can set the same parameters as using the AT commands (refer to S.4) including all GSM commands plus automatic answering parameters. Click on **Save** to save the settings. If you have finished the interface configuration and want the changes to be applied immediately, push **Save** and **Restart**.

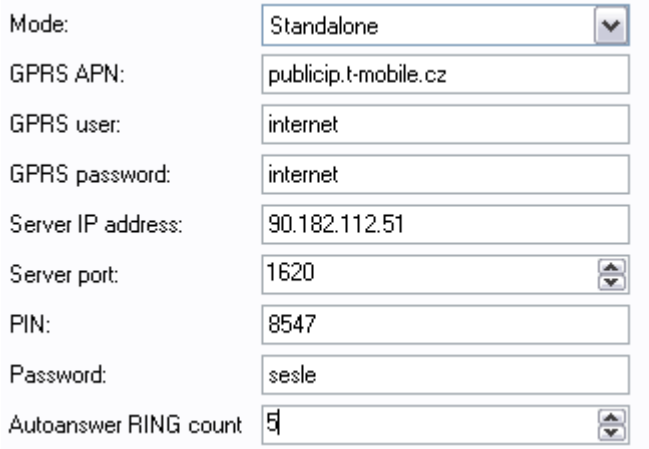


Figure 6.3 Basic Tag

The **RS-232** and **RS485/M-bus** tags help you set communication for the selected ports. Use the **User-defined AT commands** tag to enter setting commands of your own. The tag behaves as a terminal. Enter the string into the AT command field that corresponds to the supported commands included in Subs. 4.2. Click on **Send** to send the command to 2N® SmartCOM and find the reply in the field below the command.

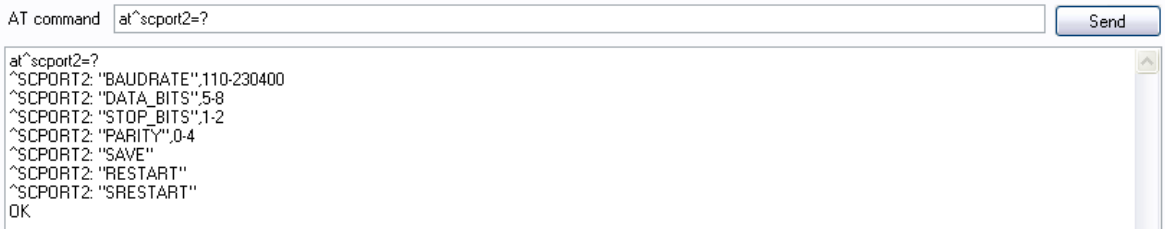


Figure 6.4 *User-Defined AT Commands Tag*

7 2N® SmartCOM 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:

- 2N® SmartCOM Server Description
- 2N® SmartCOM Control Panel Description
- 2N® SmartCOM Control Panel Use

7.1 2N® SmartCOM 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 port to be redirected via the NAT to your internal LAN.

Installation

Once launched, the installation program will scan your PC. If it finds another 2N® SmartCOM Server version, it will ask you whether or not to uninstall it. If you select NO, the installator will be terminated and if you select YES, the current 2N® SmartCOM Server version will be uninstalled.

Next, you will be asked whether or not the configuration files should be removed. 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 this port is accessible from the Internet (see above) and properly set for all terminals and applications to make the system work correctly. The so far unused http function is intended for future use. Now the installator is ready to install the 2N® SmartCOM Server. Check the displayed parameter settings carefully! No modifications will be possible after installation and you would have to reinstall the application to make a change. If you find an error, click on **Back** to return to the window where the error was made. If all parameters are OK, click on **Install** to initiate the 2N® SmartCOM Server installation process.

After installation, the 2N® SmartCOM Server service is launched automatically. If not, launch the service manually. Now the 2N® SmartCOM Server is ready for use.

Note

- The 2N® SmartCOM Server requires **10 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**.

7.2 2N® SmartCOM 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 installator 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 **10 MB** of free disk space at least for installation.

Figure 7.1
2N® SmartCOM Control Panel Icon

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.

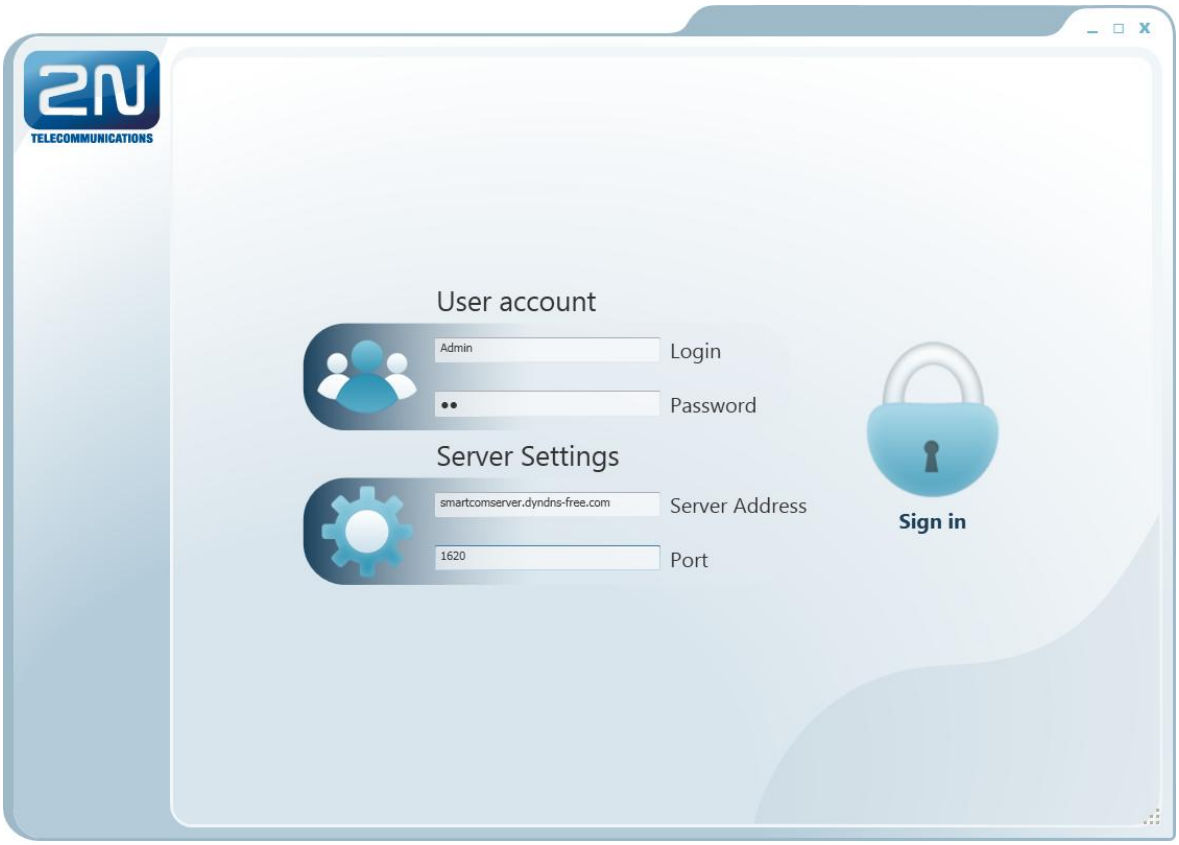
Caution

- **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 localhost

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** item as selected during your 2N® SmartCOM Server installation. Contact you network administrator for correct settings. Refer to Fig. 7.2 for options.

Figure 7.2 *Sign-In Window*



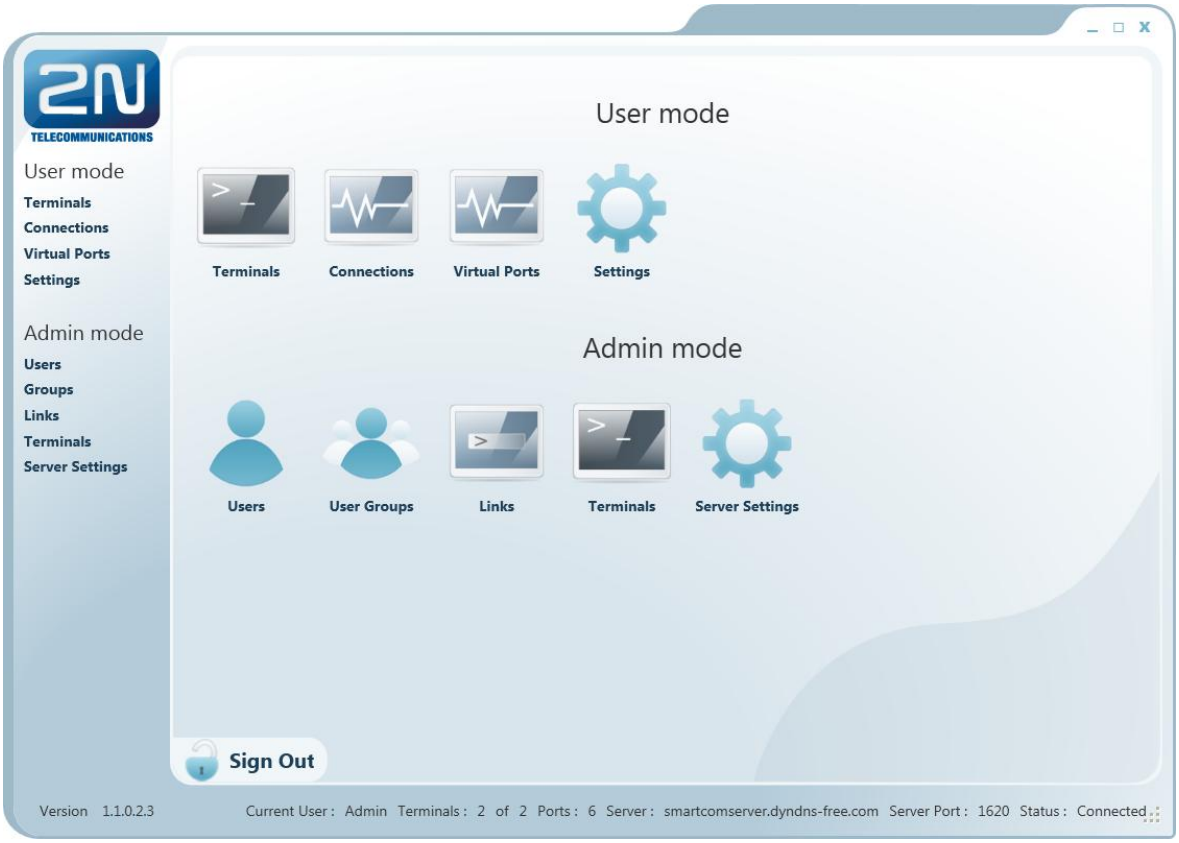
Introduction to Application

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. Refer to Fig. 7.3. for details.

Figure 7.3
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.

.

7.3 2N® SmartCOM Control Panel Use

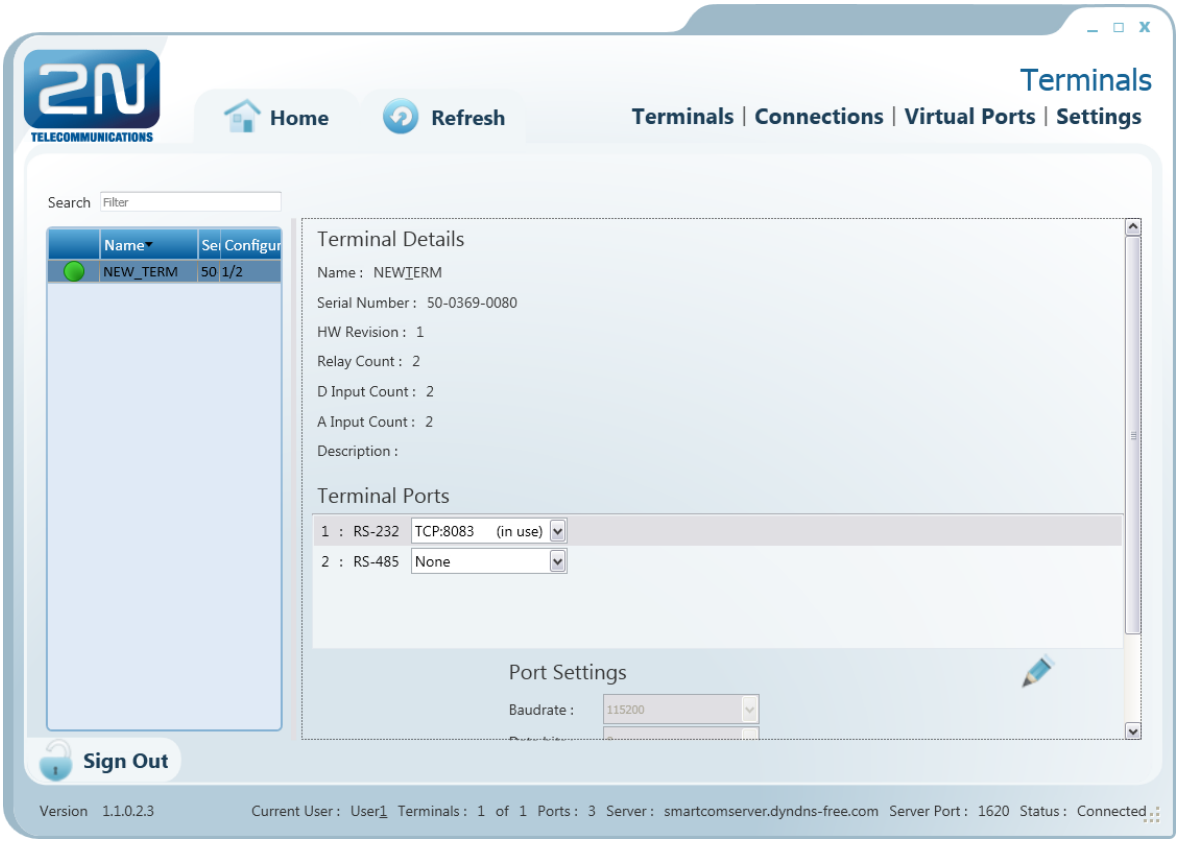
The main purpose of the 2N® SmartCOM Control Panel is to virtualise ports and facilitate connection to terminals. The application also provides comfortable administration and user management including assignment of terminal administration rights, thus allowing users to manage a high number of terminals 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 7.4
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 7.5
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 digital 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, Input Circuits, for more details on input circuit function and calibration.

Connections

Figure 7.6
Connections Menu

The **Connections** menu contains a table with 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 Incoming data and Outgoing data show the amount of data transmitted in one direction and are for information only.

Click on **Start** to interconnect the terminal and the virtual port. If one virtual port is used by more terminals than one, the other terminals will not be allowed to start until the first connection has been terminated. Refer to the note below. Click on **Stop** to terminate communication.

Note

- You can configure more terminals for one virtual port but use just one terminal connected to one virtual port for one connection.

When another user gets connected to the terminal, the **Start** buttons turns orange. Now you can press the button and take over the connection. The original user will be disconnected and the terminal will connect to the selected virtual port of the currently logged in user.

Click on the 'cross' to cancel easily the connection between the virtual port of the application and the physical port of the terminal. The appropriate row will be removed from the table upon your click.

Virtual Ports

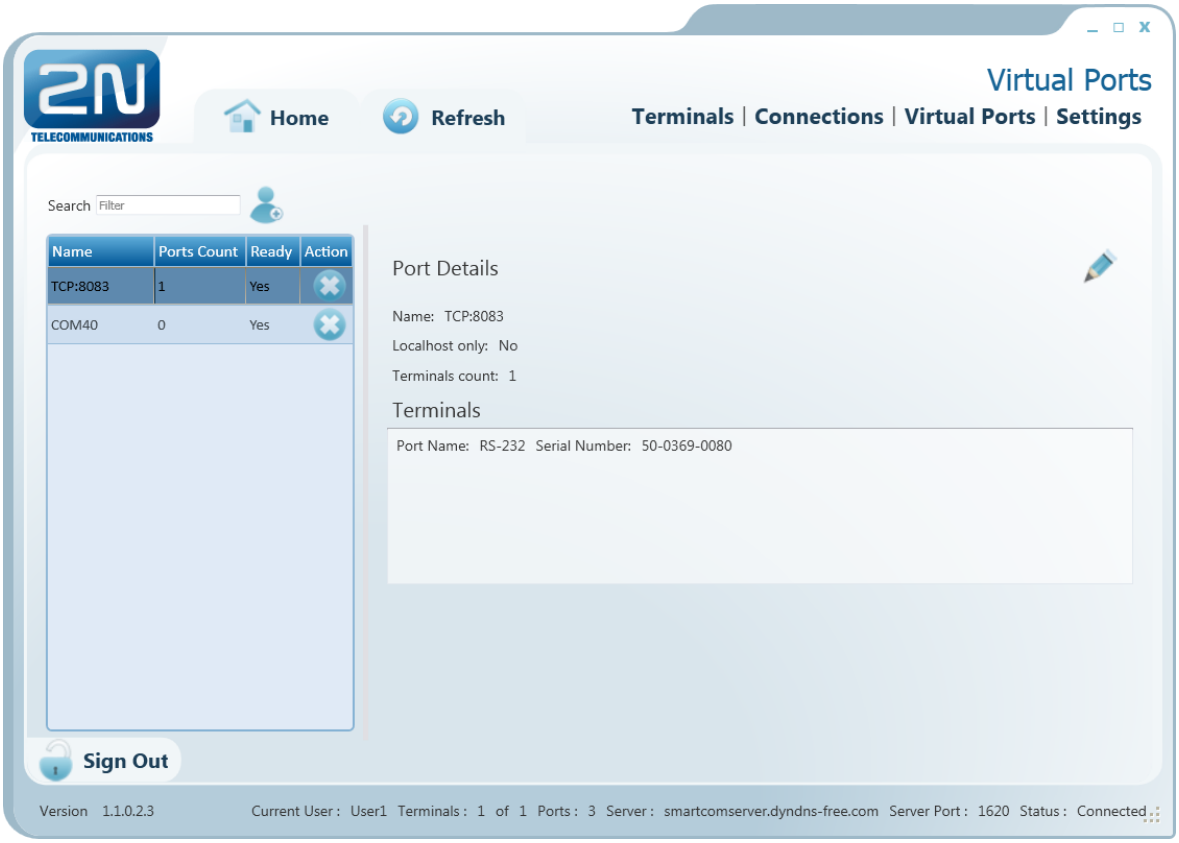


Figure 7.7
Virtual Ports Menu

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 localhost only** to enable the port use for the current PC only. Finally, click on **Create**.

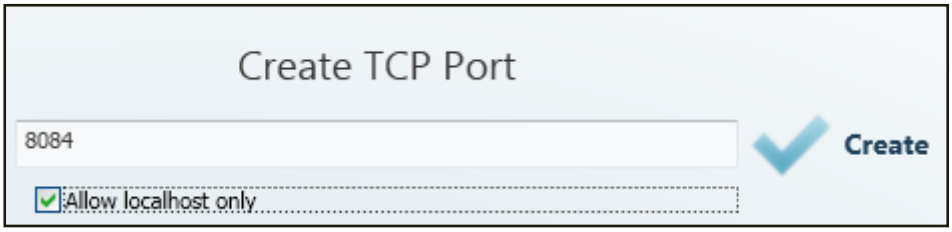


Figure 7.8
Create TCP Port

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.

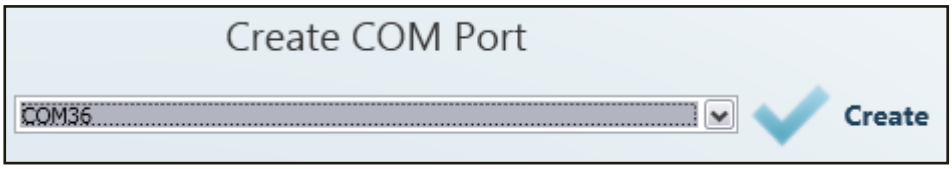
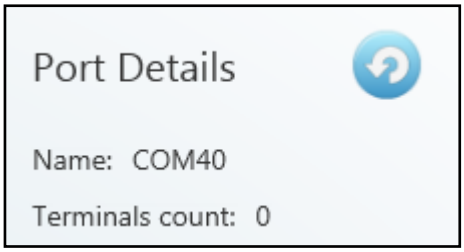


Figure 7.9
Create COM Port

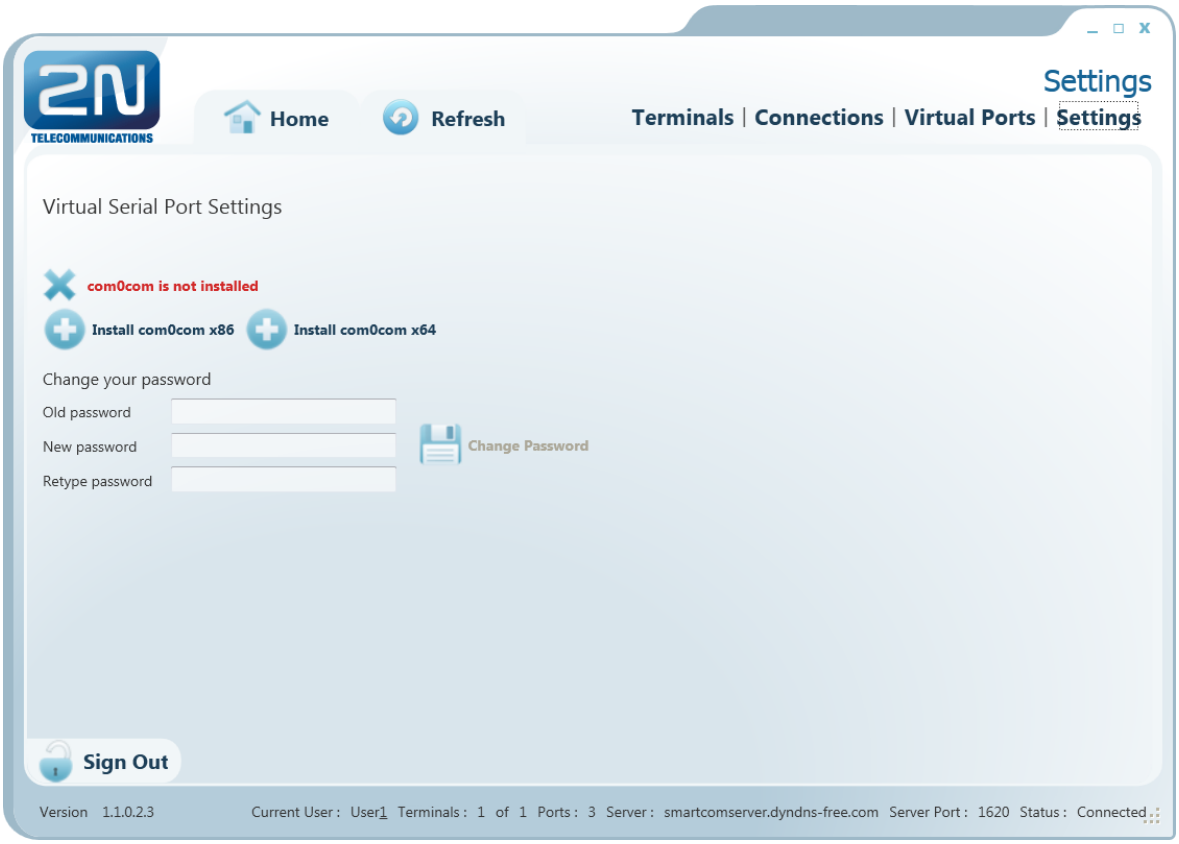
Figure 7.10
Refresh Button

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.



Settings

Figure 7.11
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** menu. If the com0com driver is not installed, the 'com0com is not installed' message gets displayed as shown in Fig. 7.7. 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

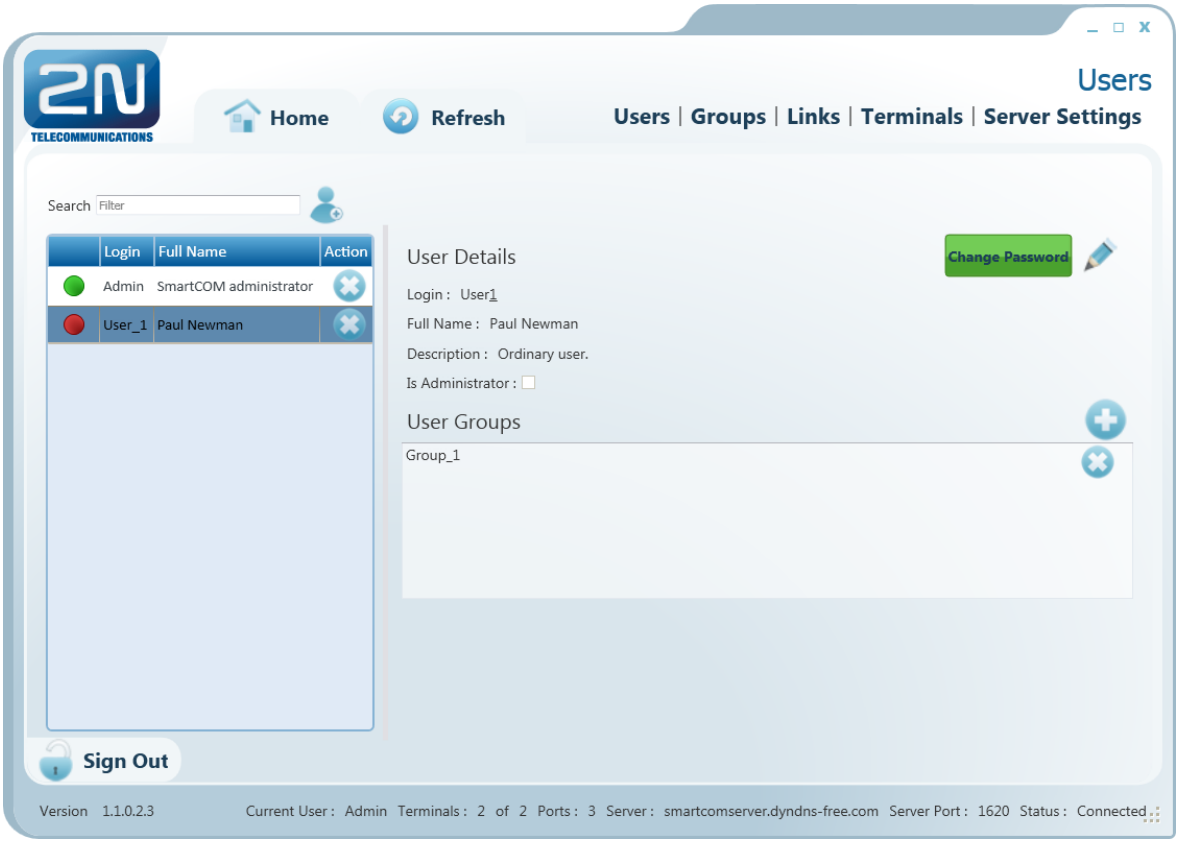
- The installation requires **0.5 MB** of free disk space at least.

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**, **User Groups**, **Links**, **Terminals** and **Server Settings** menus. See the subsections below for details.

Users

Figure 7.12
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.

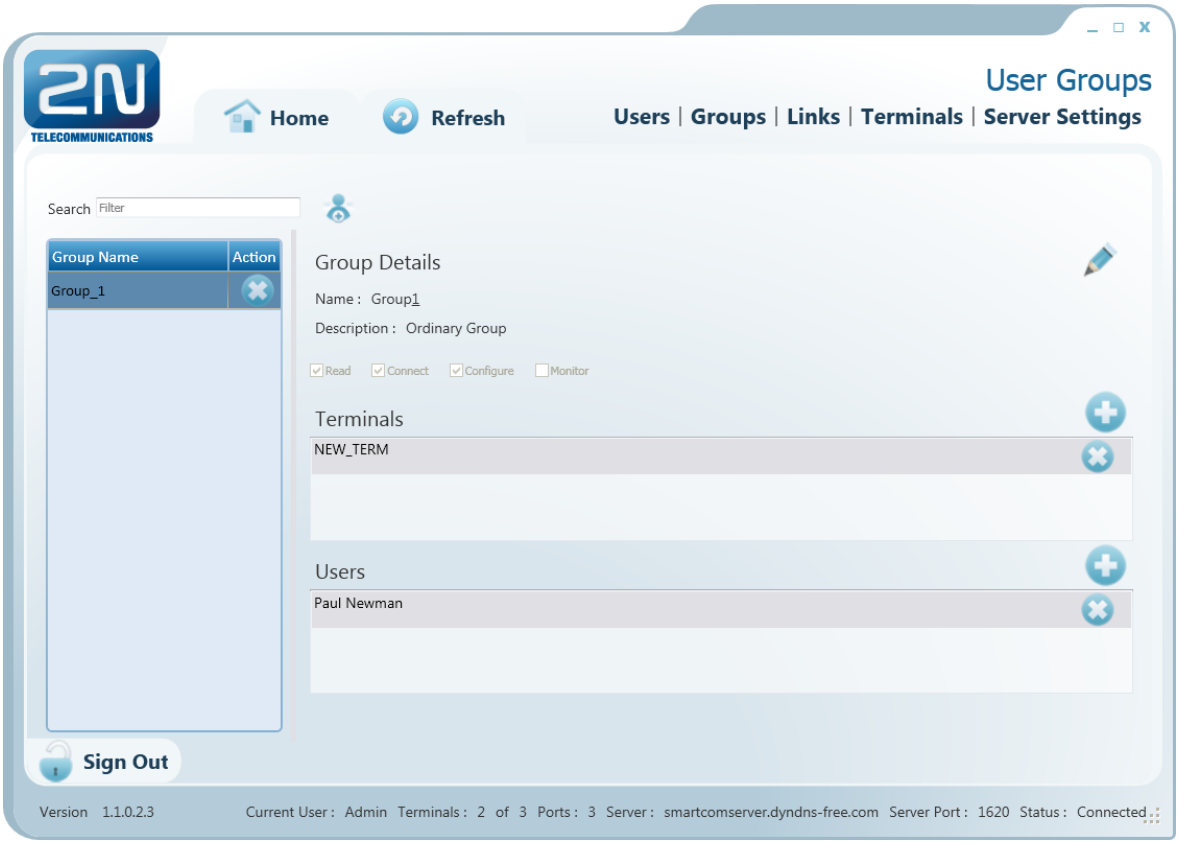
The **User Groups** menu contains the user groups to which the user is assigned. Click on **Add** and select an item from the list to create a new group. Push **Remove** to remove a group from the list.

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.

User Groups

Figure 7.13
User Groups Menu



The **User 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.

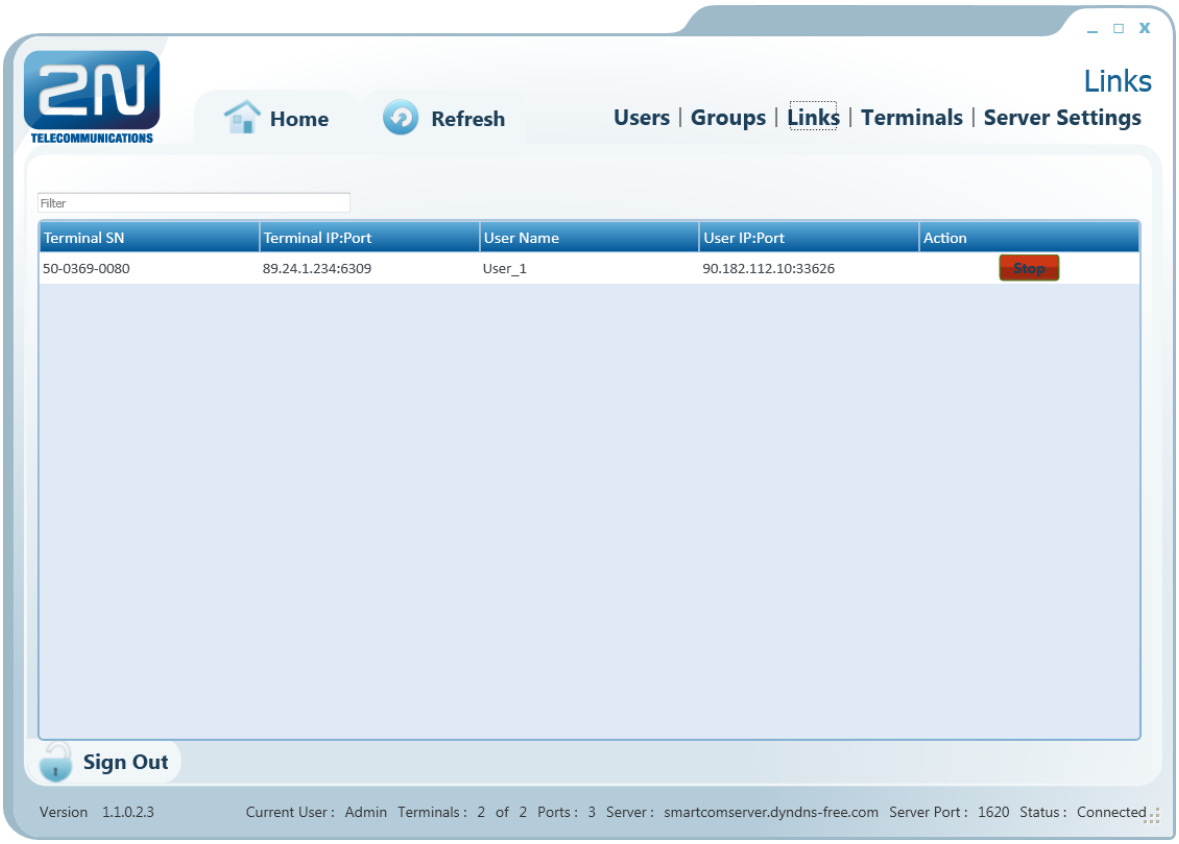
The **Users** menu includes a list of users assigned to this group. Click on **Add** and select an item from the list to add a user. Click on **Remove** to remove a user from the list.

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 7.14
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

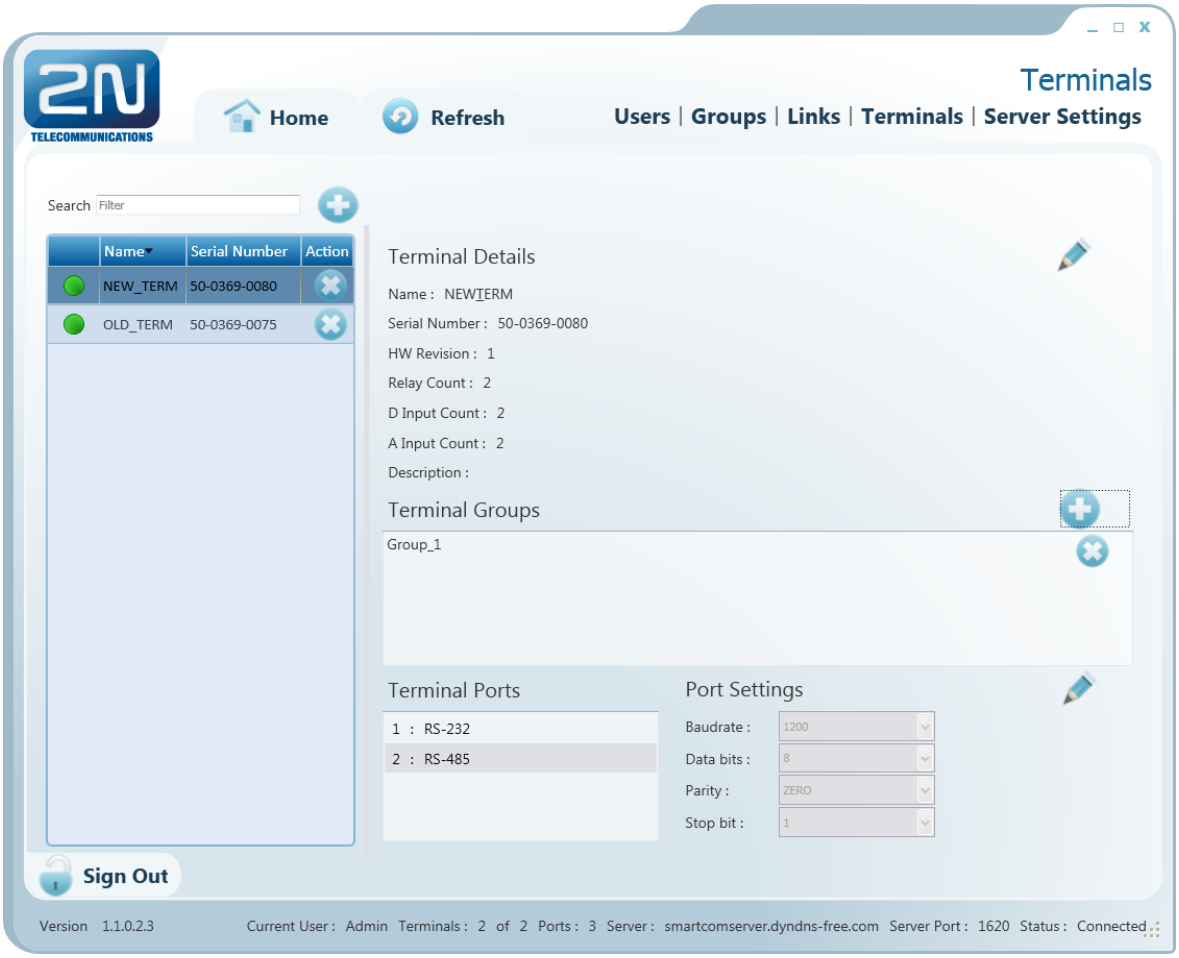


Figure 7.15 *Admin Mode Terminals Menu*

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.

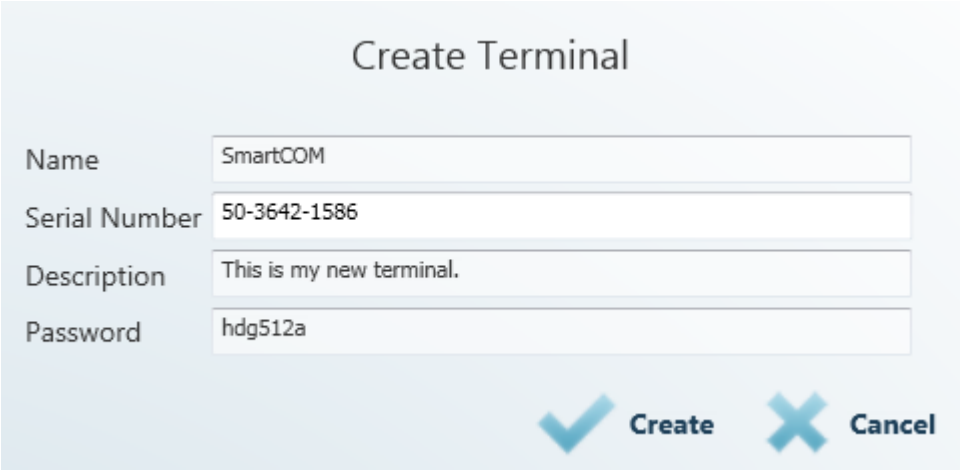
Specify in the **Terminal Groups** in which group the selected terminal shall be visible (i.e. which group shall be allowed to use this terminal). Click on **Add** to add a group. Click on **Remove** to remove a group from the list.

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.

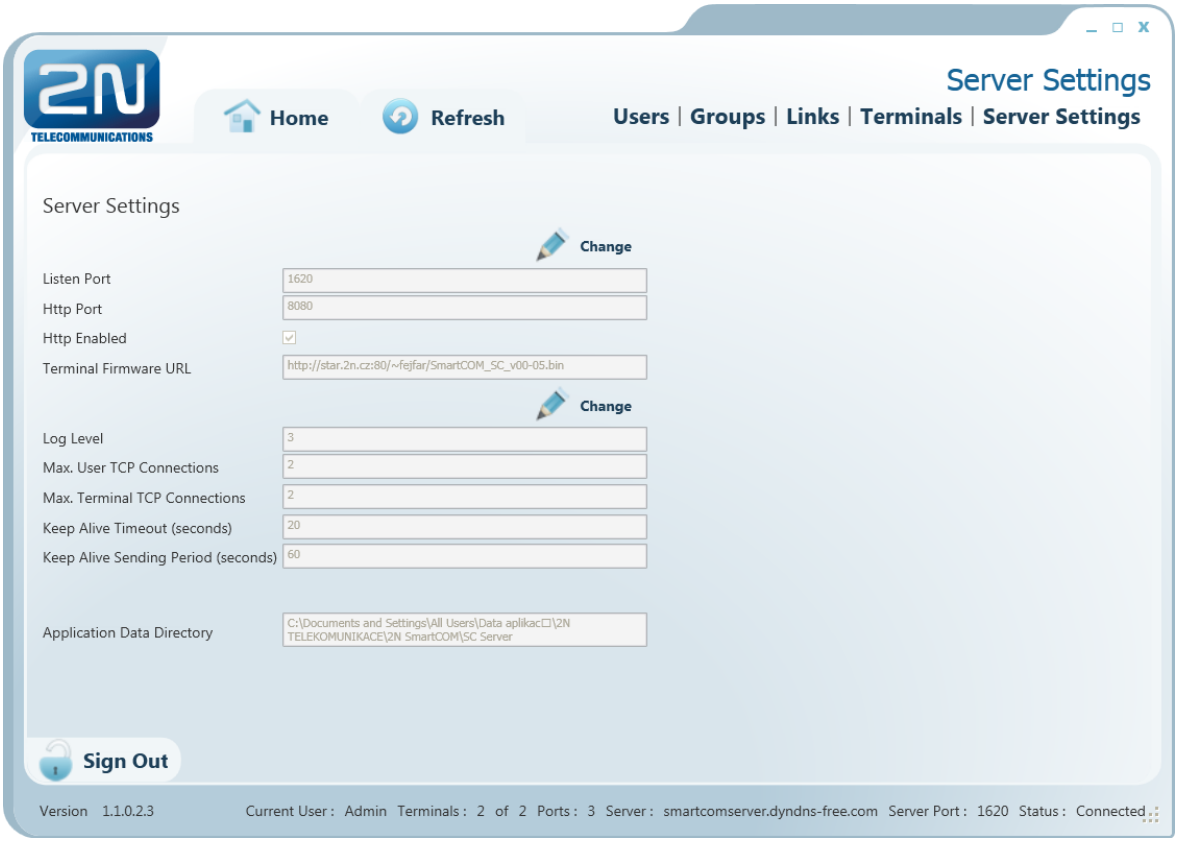
Figure 7.16
Create Terminal



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 7.17
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.

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 other part does not affect the server function. You can modify the **Log level** setting, 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 **KeepAlive** 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 Server 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.

Firmware Management

Figure 7.18
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** button. 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.

Note

- One default firmware version identical with the version of the 2N® SmartCOM Control Panel is only available after a new 2N® SmartCOM 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.

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.

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.

8 Maintenance

This section describes how to maintain the **2N® SmartCOM** product.

Here is what you can find in this section:

- Firmware Upgrade (Update)
- Factory Default Reset
- Repairs

Firmware Upgrade (Update)

The 2N® SmartCOM firmware is factory-set and can be updated. 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://star.2n.cz/~fejfar/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

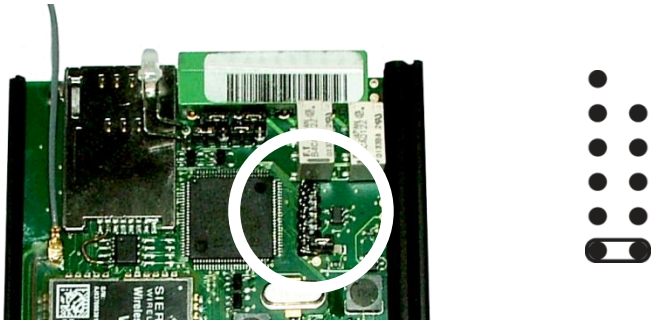
- Make sure that 2N® SmartCOM **is** connected to the Internet during the whole process of firmware upgrading to avoid firmware installation failure.

Factory Default Reset

2N® SmartCOM can be factory reset. To do so, loosen the screws and remove the upper part of the case.

Figure 8.1

Factory Reset Button



Disconnect 2N® SmartCOM from the power supply. Connect the jumper as shown in Fig. 5.1 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.

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.

9 Technical Parameters

This section provides a list of **2N® SmartCOM** technical parameters.

9.1 Technical Parameters

Power Supply

DC power supply	12 V
Mains supply	100-240V adapter / 12V – 0.5A 50-60Hz
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
Current range	4 – 20 mA / 0 – 20 mA
Input impedance	

Working Conditions

Temperature	-40°C ÷ 85°C
Relative humidity	0 ÷ 80%

Others

Dimensions (without connectors)	69 x 100 x 24 mm
CE certificate	

10 Supplementary Information

This section provides supplementary information on **2N® SmartCOM**.

Here is what you can find in this section:

- Applicable Directives, Laws and Regulations
- List of Figures
- List of Abbreviations
- General Instructions and Cautions

10.1 Regulations, Laws and Directives

2N® SmartCOM conforms to the following directives, laws and regulations:

- Act No. 22/1997 Coll. Of January 24, 1997 on technical requirements of products and amendments to some laws
- 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
- Governmental Regulation No. 426/2000 Coll. on technical requirements of radio and telecommunications terminal equipment
- 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
- Governmental Regulation No. 17/2003 Coll. on technical requirements of low voltage electrical equipment
- Directive 2004/108/EC of the Council of 15 December 2004 on the harmonisation of the laws of Member States relating to electromagnetic compatibility
- Governmental Regulation No. 616/2006 Coll. on technical requirements of products in terms of electromagnetic compatibility
- Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 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

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10.3 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)

10.4 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.

TELECOMMUNICATIONS

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