



2N[®]

SmartGate

GSM gateway



User guide

Version

1.1.2

www.2n.cz

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 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.



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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[®] EasyRoute 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 is the holder of the ISO 9001:2000 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 products.

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1

Product Overview

In this section, we introduce the **2N® SmartGate** product, outline its application options and highlight the advantages following from its use. This chapter also includes safety instructions.

Here is what you can find in this section:

- Product Description
- Manual changes description
- Abbreviations, Terms and Pictograms Used.

1.1 Product Description

Basic Features

- The primary purpose of 2N® SmartGate is to transmit voice between GSM network and attached phone terminals. You can connect terminal with FXO interface (trunk line of PBX, phone set, answering machine etc.) to FXS interface on 2N® SmartGate (connector with phone icon) and terminal with FXS interface (extension line of PBX) to FXO interface on 2N® SmartGate (connector with crossed out phone icon).
- You can establish data connections (GPRS, CSD) and send/receive SMS using 2N® SmartGate in combination with a PC and appropriate software.
- You can send an SMS to a pre-programmed number using the SMS sending input.
- Analogue fax transmission on some models.

Advantages of 2N® SmartGate use

- **Call cost cutting** – the calls are routed to GSM or analog network according to their number prefix. Route all GSM calls from PBX to 2N® SmartGate to save a lot on PSTN – GSM calls.
- **Easy installation** – you can easily program 2N® SmartGate as you need with enclosed SW.
- **You get all you need in the delivery** – your 2N® SmartGate delivery contains all you need to operate the system (the power supply adapter, telephone cables, PC serial cable, SMS input connector, CD-ROM with software).
- **Solution for sites without telephone lines** – such as mountain chalets, exhibitions, conferences, etc.
- **DialThru technology** – all your calls will be routed most cost-effective way.
- **ME – Mobility Extension** – you never miss an incoming call from analog network. Incoming call will ring on connected phone and on your mobile phone too.
- **CLIP** – 2N® SmartGate is equipped with the FSK-based CLIP feature, so if a terminal capable of receiving the CLIP is used you know the caller's number.
- **Quick data connection** – 2N® SmartGate transmits data using the high-speed GPRS connection (GPRS class 10, max. 85.6 kbps).
- **SMS sending input** – simply send an SMS to a pre-programmed number by closing the contact. Recommended for easy supervision, simple securing, etc.
- **Radiation hazard minimization** – you are not exposed to a direct effect of the antenna RF electromagnetic field while telephoning as opposed to mobile telephones.
- **Full GSM coverage** – 2N® SmartGate is available as quadband (850, 900, 1800, 1900MHz).

Safety Precautions



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



Do not switch on 2N® SmartGate aboard of a plane.



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



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



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



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



The voltage value mentioned on the adapter may not be exceeded. If you connect 2N® SmartGate to another power supply, make sure that the voltage value is in the acceptable range.



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

1.2 Changes

Manual Version	Amendments to Earlier Versions
1.0.0	The User Manual applies to 2N® SmartGate FW Version 1.00A.
1.0.1	Analogue FAX support. (optionally).
1.0.2	Analogue Modem support, Network directing services support
1.0.3	Quadband version
1.0.4	Programming parameters using phone line (DTMF programming)
1.1.1	New design of manual
1.1.2	New version of PCManager (PCManagerUNI 2.04), Digital DTMF option AMR set on/off Quadband version only Free minutes option – only FW 1.5x and 3.5x



Caution

- The manufacturer continuously meets customer requirements by improving the firmware. For the latest 2N® SmartGate processor firmware, programming tool and User Manual see www.2n.cz.
- For a detailed description of the 2N® SmartGate firmware upgrade refer to the section devoted to the PC programming tool.

1.3 Terms and Symbols Used

Manual Symbols



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.

Future functions

Grey marked text in this document specifies functions of **2N® SmartGate** , which will be supported in the future.

2

Description and Installation

This section describes the **2N® SmartGate** product and its installation.

Here is what you can find in this section:

- Product Description
- Before You Start
- Mounting
- Telephone line connection
- SMS Sending Input connection

2.1 Description

2N® SmartGate consists of GSM gateway in white plastic cover, removable antenna and cables for connecting to phone set and PC

2N® SmartGate's status is indicated by LED diodes on its front side. All possible states are described in the following figure.

Figure 2.1
2N® SmartGate
LED indicators

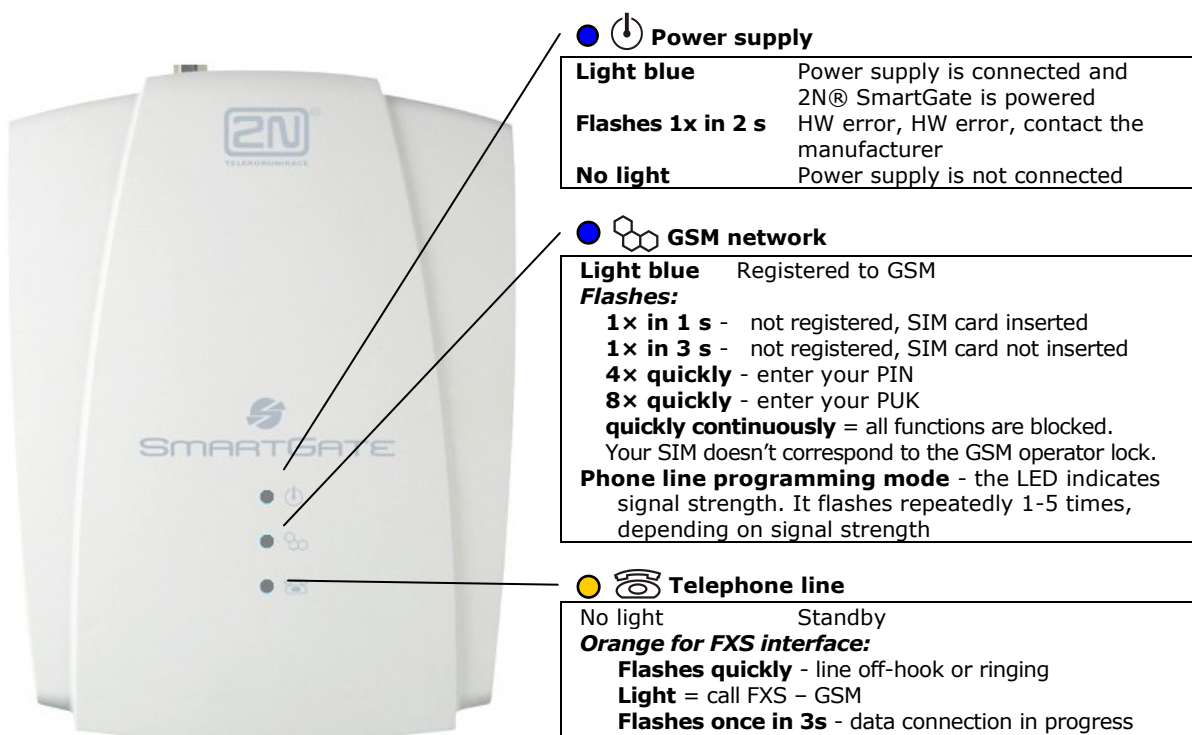
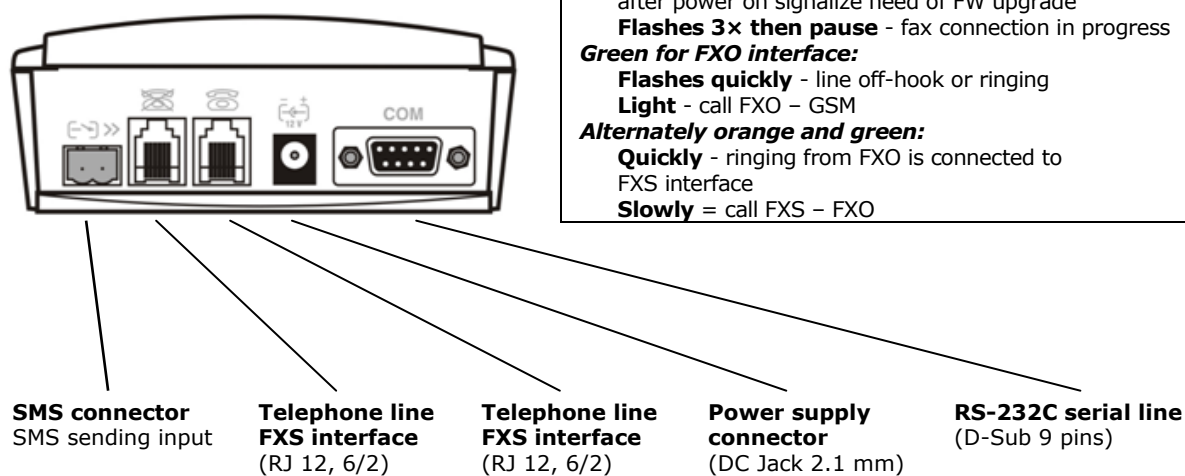


Figure 2.2
2N® SmartGate
Connectors



Telephone Line Tones – Operational Tones

The GSM gateway sends tones to the telephone line to indicate the line status. The tone frequency is 425 Hz in initial setting. Frequency is programmable; it is possible to set up double frequency tones.

Dial tone

- continuous or morse A — —
- 2N® SmartGate is ready to receive dialing.

Ringing tone

- Only — — —
- The called subscriber's telephone is ringing.
- The GSM network or connected PBX transmits this tone. For connection to GSM network is possible to generate this tone in Gateway according to setting. This tone is generated till the GSM network starts to transmit Ringback tone.

Busy tone

- — — — — —, programmable cadency

In case of call routing to GSM network 2N® SmartGate generate busy tone in any of the following cases:

- The SIM card has not been installed.
- 2N® SmartGate is not registered to GSM network.
- 2N® SmartGate is registered into a foreign network but roaming is disabled.
- The called subscriber line is busy.
- The called subscriber hangs up (disconnection).
- The called number has too many digits (more than 30).
- The called number is barred.

In case of call routing to SmartGate's FXO interface 2N® SmartGate generate busy tone in any of the following cases:

- Line is not connected. There is no current on the line.
- The called number has too many digits (more than 30).
- The called number is barred.
- If the called subscriber line is busy or called subscriber hangs up, busy tone is generated by PBX.

Dialing end signaling

- Only =
- Dialing reception has been terminated. Connection is being established.

PIN tone

- ---- ---- ----
- Enter the PIN code.
- This tone is transmitted upon power up if the PIN has to be entered manually.


PUK tone

- -----
- Enter the PUK code.
- This tone is transmitted upon repeated wrong PIN entering attempts. SIM card is blocked.



Telephone Line Tones – Programming Mode

Tones confirming/refusing the values entered are transmitted during telephone line based programming. Each tone has a different melody.


Confirmation

- 
- Confirms that the service password or parameter number entered is correct and has been accepted.

Refusal

- 
- Incorrect parameter number;
- Incorrect parameter value
- Transmitted when a parameter is cancelled with a .

Saving

- 
- Parameter value entered is correct and has been saved

2.2 Before You Start

Product Completeness Check

Check the product for completeness before installation please:

- 1× 2N® SmartGate
- 1× Antenna for direct connection¹⁾
- 1× Magnetic Antenna with coax cable¹⁾
- 1× Supply adapter
- 2× Telephone Cable
- 1× PC-connection serial cable
- 1× SMS sending input connector
- 2× Dowel
- 2× Screw
- 1× CD-ROM with User Manual and software²⁾
- 1× Quick Installation Guide + mounting pattern



Note

- ¹⁾ **The delivery includes an antenna** to be connected directly to the 2N® SmartGate SMA connector. An antenna with a cable should be used when GSM signal is poor or in case of interference with other devices
- ²⁾ **Enclosed software:**
 - 2N® SmartGate PCManager
 - 2N® SmartGate SMSgateway for easy SMS sending and receiving
 - 2N® SmartGate Driver for PC
 - User Manual in format PDF
 - Lists of AT Commands for SIEMENS GSM modules used

Installation requirements

- 2N® SmartGate is designed for vertical mounting on suspension holes (use the mounting pattern). This position is the best for signal reception because a vertical antenna is used. 2N® SmartGate can be operated in the horizontal position too where the GSM signal is good.
- Install 2N® SmartGate with respect to the GSM signal strength – check the signal strength using the PCManager.
- Place 2N® SmartGate out of range of sensitive devices and human bodies for electromagnetic interference reasons.
- For the allowed range of operating temperatures refer to the “Technical Parameters”.

- 2N® SmartGate can disturb other telecommunication systems. Place phone lines and connected terminals and PBX's faraway from antenna.
- It is impossible to operate 2N® SmartGate on sites exposed to direct solar radiation or near heat sources.
- 2N® SmartGate is designed for indoor use. It may not be exposed to rain, flowing water, condensed moisture, fog, etc.
- 2N® SmartGate may not be exposed to aggressive gas, acid vapours, solvents, etc.
- 2N® SmartGate is not designed for environments with high vibrations such as means of transport, machine rooms, etc

**Caution**

- Check that you have everything needed for 2N® SmartGate start-up (SIM card, analogue phone set or FXO port of PBX, eventually PC etc.)

2.3 Mounting

External Antenna Connection

Screw the antenna enclosed into the SMA antenna connector.



Caution

- Tighten the antenna connector **gently with your hand** – never use wrenches!



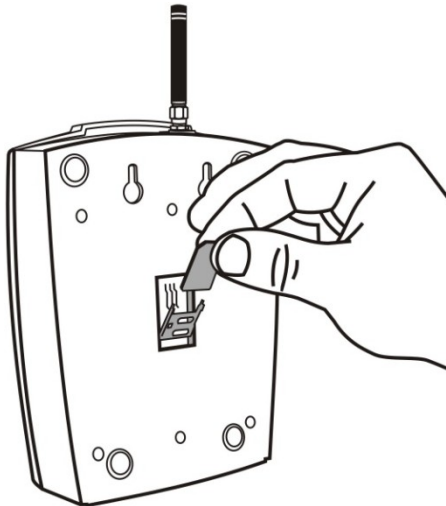
Note

- The antenna enclosed has a sufficient gain for trouble-free operation in normal conditions. If the GSM signal is poor or you want to place your antenna separately from SmartGate, you can use an antenna with an SMA-connector terminated cable. The antenna should be mounted vertically.
- The Antenna shall be located within the same building as the main equipment.
- For antenna and cable parameters see the “*Technical Parameters*”.

SIM Card Installation

Open the SIM card holder on SmartGate’s backside, insert the SIM card and close it properly.

Figure 2.3
SIM Card
Installation



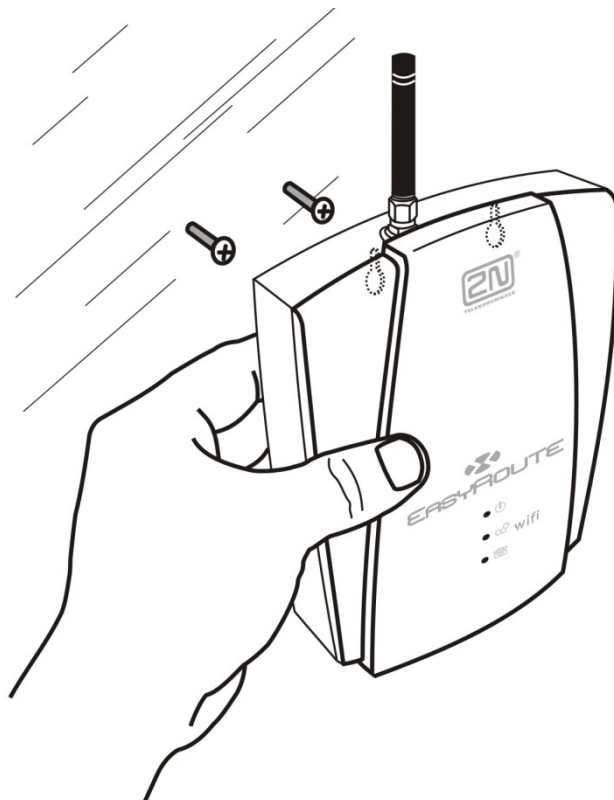
Cautions

- Make sure that the GSM provider’s SIM card is compatible with the GSM network supported by your 2N® SmartGate version.
- Select the required GSM provider and SIM card services, such as call forwarding, call barring, preferred networks, SMS service centre, etc. in your mobile phone **before inserting your SIM card in 2N® SmartGate**.

Wall mounting

2N® SmartGate is equipped with two hangings on the back side for wall mounting. For drilling holes to the wall could be used drill pattern in QuickStart.

Figure 2.4
*Zavěšení
2N® SmartGate
na zed*



Power Supply Connection

2N® SmartGate is fed with 10-16V DC. Where a source other than the included power supply adapter is used, the voltage range and polarity shown on the 2N® SmartGate power supply connector have to be maintained.



Warning

- **Do not activate the power supply** until the antenna is connected to 2N® SmartGate to avoid the GSM module damage.

2.4 Telephone line connection

DialThru gateway – basic connection

Phone set is normally connected to extension line of PBX. Wire up 2N® SmartGate between phone set and PBX. Link extension line of PBX to FXO interface and phone set to FXS interface on SmartGate. Optionally you can connect analogue fax (special model of SmartGate).

If FXO interface of 2N® SmartGate is connected directly to PSTN, you can connect only equipment that is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC to FXS port.

Gateway for extension line of PBX

Link free extension line of your PBX to FXO interface on SmartGate. FXS interface remains unconnected.

Gateway for trunk line of PBX

Link free trunk line of your PBX to FXS interface on SmartGate. Program PBX to route all GSM calls to SmartGate. Incoming calls from GSM network will be routed to PBX.

You can connect a standard telephone, answering machine or any other FXO-interface terminal to SmartGate. Outgoing calls from phone will be routed to GSM network, incoming calls from GSM will ring on the phone. Optionally you can connect analogue fax or modem (special model of SmartGate).

2N® SmartGate is equipped with the FSK-based CLIP and so it is advantageous to connect a terminal that is able to display or process the CLI. You must activate the function on SmartGate.

**Tip**

- 2N® SmartGate is equipped with the FSK-based CLIP and so it is advantageous to connect a terminal that is able to display the CLI.

Gateway for both, trunk and extension, lines of PBX

2N® SmartGate is very flexible thanks to his three routing tables. You can connect trunk and extension lines of one PBX to proper connectors on SmartGate. You can program the complex as follows: outgoing calls from PBX will be routed through trunk line to GSM network. Incoming calls from GSM will be routed to extension line of PBX. This configuration is suitable for PBX's with no capability of dial-in on trunk lines.

2.5 SMS Sending Input Connection

You have got a special connector for easy connection to SmartGate. The connector is equipped with screwing clamps to connect wires from a switching contact (device to be monitored). The other connector end can be connected to the respective 2N® SmartGate panel connector.

The input is designed for the contact of relay connected between the input pins. The input is activated by contact closing (pin interconnection).

A transistor switch or logic signal can be used too. The pin near the telephone line connector is connected to GND of the device the second one is active. Please, respect the loop current polarity. There is over-voltage protection up to +12V DC there.

3

Configuration 2N® SmartGate

This section describes configuration of the product **2N® SmartGate**.

Here is what you can find in this section:

- PC Connection to 2N® SmartGate
- 2N® SmartGate Parameter Programming
- Table of Parameters

3.1 2N® SmartGate parameters configuration

PC Connection

You have got a serial cable for PC connection. It is a modem cable where all of the 9 pins are 1:1 interconnected – in case you want to use another cable.



Caution

- Make sure that a longer cable works properly to avoid errors at high transmission rates.

2N® SmartGate Parameter Programming

Most of SmartGate's parameters have such default values that meet most users' demands and need not be changed. Usually you have to program routing tables according to 2N® SmartGate usage. There are two possibilities how to program SmartGate:

- Use phone line and DTMF programming from connected phone set. This is not applicable for all parameters
- Use a PC with the PCManager installed. Using this way all parameters supported by 2N® SmartGate can be programmed.

Telephone Line based Programming





1. Hook off the telephone, you can hear the dial tone or the busy tone, and the Line LED starts flashing.
2. Enter the service password (12345 by default, can be changed) with the DTMF; to cancel a wrong password hang up before sending the character. To confirm password enter a .
3. If you have entered a correct password, you hear the confirmation tone. If not, the dialed number may be sent to the GSM network as a call. To prevent this, hang up when you do not hear the confirmation tone.
4. 2N® SmartGate shall remain in the programming mode until hang-up.
5. Enter the number of the parameter to be programmed and press a . If the parameter number is correct, you can hear the confirmation tone, if not, you get the refusal tone and can re-enter the parameter number.
6. When the parameter number is confirmed, enter the allowed parameter value and press a . If the parameter value is in the allowed range, you can hear the saving tone, if not, you get the refusal tone. You can enter another parameter number in either case.

Numeric parameters are programmed using numbers in units included in the parameter description. The step for setting must be respected. For parameters with different setting are values defined in the parameters description (in parenthesis).

To cancel any programming step in the programming mode, press a **#**. Having done so, you can hear the refusal tone and can enter a new parameter number. Parameters are saved when the saving tone is transmitted. Hang up to quit programming.

During phone line programming mode is the LED 'GSM Network' showing the signal strenght

Example:

Dial	Confirmation	Description
1 2 3 4 5 *		Password entering, OK
1 0 *		Transmission volume parameter, OK
3 *		Set to medium level, saved
5 5 *		Non-existent parameter number, refusal

PC based Programming

For programming, connect 2N® SmartGate to a PC with a serial cable and make sure that the software PCManager is installed. Programming is intuitive and easy. All items and parameters are accompanied with texts hints - just point at anything with the mouse cursor.

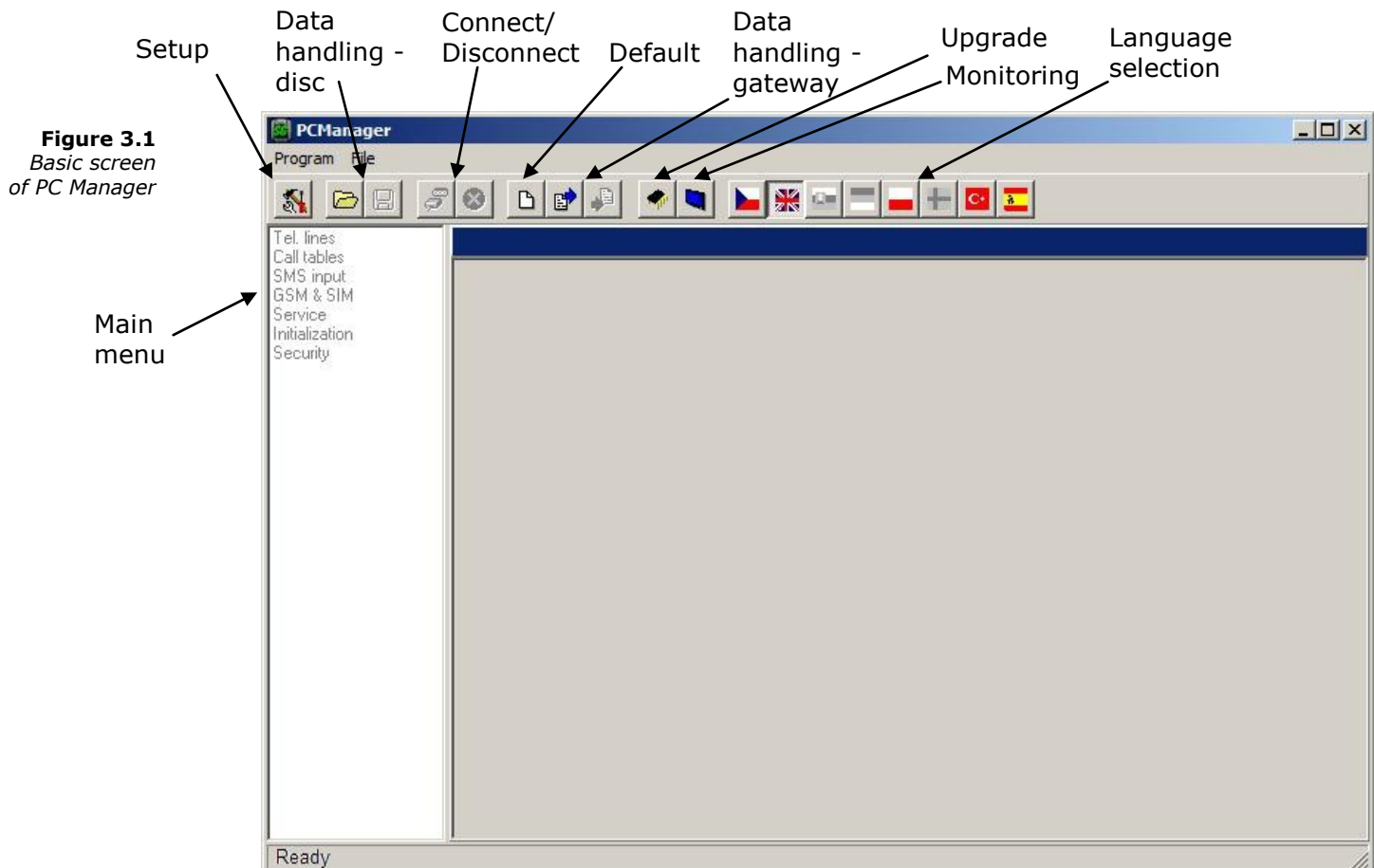
2N® SmartGate data uploading and storing, including firmware upgrade, are executed in a special mode, in which 2N® SmartGate waits for about 3s after power up (all LEDs are on). If instructed so by the PCManager during this timeout, 2N® SmartGate remains in this mode as long as it is necessary. If 2N® SmartGate is not reset after the PCManager is terminated, switch the system off and on again.

Basic Programming Instructions

1. Run the PCManager and select the language for displaying texts on the top bar.
2. For local access use Setup for COM port selection
3. For remote access (SmartGate with remote access only) use Setup for modem modem selection ant setting. Use Connect and Disconnect for connecting remote gateway.
4. For preparing configuration data you can start with default configuration, you have to select type of gateway. Another possibility is to load prepared data from disc.
5. For loading configuration from the connected gateway, saving configuration to the gateway and firmware upgrade you have to set the gateway to special programming mode. After selection of the service switch the gateway off and on again.
6. You can set all parameters needed for proper functionality of the gateway using menu in the left part of PCManager screen. After selecting any line of menu,

the table for setting parameters will open. If you point at a parameter with the mouse, the help text is displayed.

7. When the setting is finished, save data into the gateway. If the gateway is not in its special programming mode, you are invited to set this mode again according point 5.
8. You can use service Monitor to view parameters of connection and some more information. The gateway must be connected to GSM network



Further Data Handling Options

The gateway configuration settings can be saved in a PC file and reloaded into the PCManager. This is recommended for backing up of current configuration



Caution

- The table Security includes the PIN code and service password. These parameters have a special handling. They are not saved in a PC file for security reasons. If you load a PC file into the PCManager and then into SmartGate, the PIN and service password should not change unless you change them manually before saving.



Caution

- All tables are filled-in with default values after PCManager start. It is recommended to load data from 2N® SmartGate before parameters programming and saving. If you only save data after PCManager start, all parameters except the PIN and service password in the 2N® SmartGate memory will have default values.



Caution

- The PIN and service password can only be modified either manually or by full initialization.

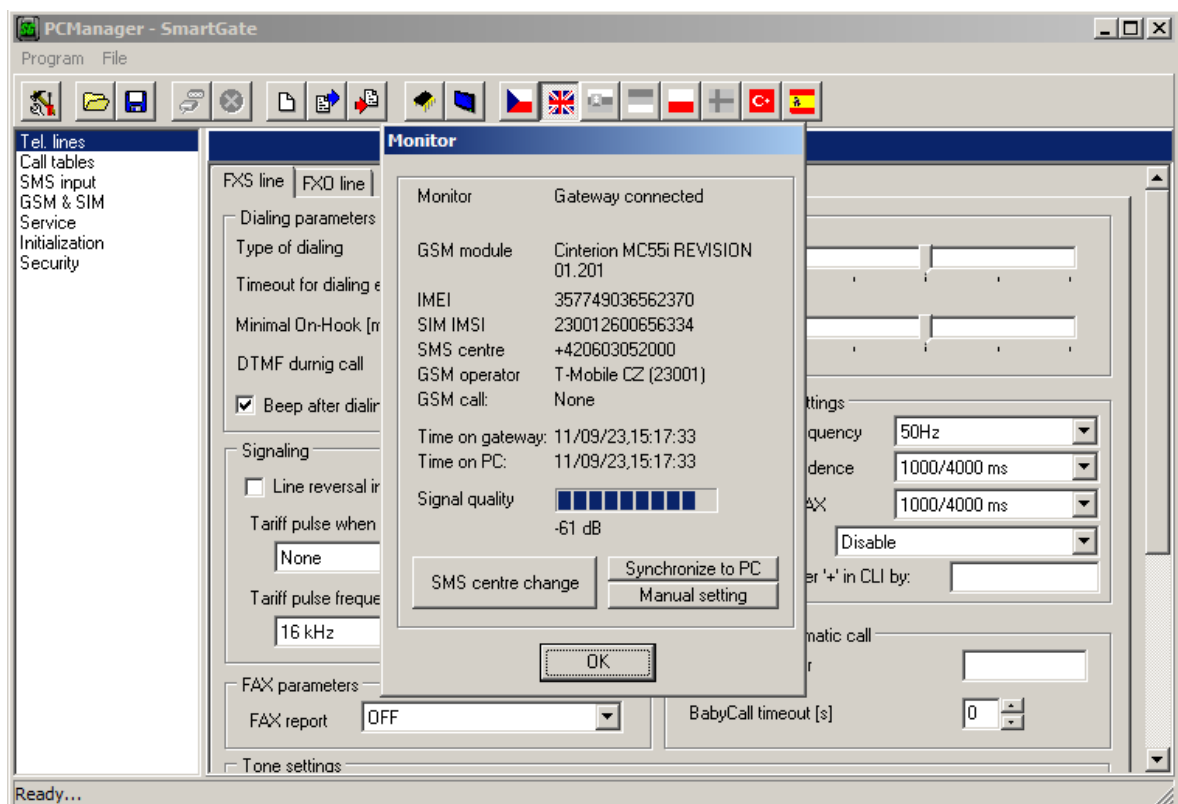
Monitoring

Monitoring is active when the gateway is in operation and registered to the GSM network. If the gateway is not registered to GSM, the COM is blocked and no monitoring can be made.

This simple informative function helps you identify:

- The GSM module type and IMEI ID;
- The SIM card IMSI ID and selected SMS service centre necessary for SMS sending;
- The GSM provider's name and signal strength received by 2N® SmartGate - this information helps you find the optimum signal location (the information is updated in 10s intervals);
- The 2N® SmartGate line status – standby, outgoing call, incoming call including telephone number. The COM is locked during dialing and incoming call ringing, so the PCManager reports COM blocking.
- Time set in gateway, the time is taken from network, when the network supplies this information. It is possible to set it from PC or manually, this information is lost, when the gateway is switched off. Special versions of gateways are equipped with backup supply to support clock during power failure.

Figure 3.2
SmartGate
PC Manager
monitor



Firmware Upgrade

The manufacturer responds to clients' requirements with periodical firmware updating. The current 2N® SmartGate firmware, PCManager and User Manual are available on www.2n.cz. The latest firmware version is always included in every new PCManager installation.

Upgrading procedure:

1. Run the PCManager, select the language for displaying texts on the right-hand side.
2. Click on the upgrade – if 2N® SmartGate is not in its special programming mode, you are invited to switch 2N® SmartGate off and on again.
3. If there is more then one file in the PCManager directory, chose one of them. The upgrade takes place automatically. **Do not switch your PC or 2N® SmartGate off during the process of upgrading!**



Caution

- The PCManager checks the software version in 2N® SmartGate and the upgrade file. If the version in the file is new, everything is all right. An identical or earlier software version is stored in 2N® SmartGate too but the PCManager requires confirmation to be on the safe side.




Caution

- The manufacturer responds to clients' requirements with periodical firmware updating. The latest 2N® SmartGate firmware, PCManager and User Manual are available on www.2n.cz.

3.2 Table of Parameters

All programmable parameters are listed in this section. Each parameter is accompanied with the unit used, function number (if available) for programming via a telephone line, description of SmartGate's behavior, setting options, setting step and default (initialization) value.

Numeric parameters must be set in unit listed in the parameter description. For parameters with different setting are values defined in the parameters description (for phone line programming in parenthesis). When phone line programming is

used, character  can't be included in the string, because it is dedicated for confirmation of the new parameter value.

Telephone interface FXS parameters

Dialing parameters

Type of dialing Function No.: 100

Select the dialing type to be received by 2N® SmartGate on the FXS interface. 2N® SmartGate accepts only the selected type of dialing, ignoring the others.

Setting options: *DTMF (0)* -2N® SmartGate receives tone dialing only.
 Pulse (1) -2N® SmartGate receives pulse dialing only

Default setting: *DTMF*

Timeout for dialing end recognize [s] Function No.: 101

Timeout during which 2N® SmartGate waits for further digits to be dialed. It starts to establish connection when this timeout passes.

Setting options: *1-255 s*

Setting step: *1 s*

Default setting: *5 s*

Minimal On Hook [ms] Function No.: 102

The minimum line current break that 2N® SmartGate evaluates as hang-up.

Setting options: *100-25500 ms*

Setting step: *100 ms*

Default setting: *500 ms*

DTMF during call**Function No.:**

When DTMF is transmitted in voice channel of GSM network problem with quality can occur, because the GSM compression can damage the signal. You can set digital transmission mode, than SmartGate mutes original DTMF signal from telephone line, and instead of this transmits digital DTMF in signaling channel. This function can't solve problems, when Easy Gate receives DTMF, it influences sending direction only and it is active only when Easy Gate originates the call.

Setting options: *Analogue – DTMF transmission trough voice channel without change*

Digital – DTMF is muted in voice channel and is transmitted digitally

Default setting: *Analogue*

Beep after dialing end**Function No.: 103**

Select a beep to signal the end of dialing (beginning of outgoing call establishing).

Setting options: *YES(1)/NO(0)*

Default setting: *YES*

Signaling

Line reversal indication for call in progress Function No.:110

Select call in progress signaling by telephone line polarity reversal on FXS interface. There is voltage of reversed polarity on the telephone line during the whole call.

Setting options: *YES(1)/NO(0)*

Default setting: *NO*

Tariff pulse when call starts/ends**Function No.: 111**

Signaling of call start or end by tariff pulse.

Setting options: *None (0)-2N® SmartGate doesn't send tariff pulse as signaling of callstart/end.*

Call end (1) -2N® SmartGate sends tariff pulse when call ends.

Call start (2)-2N® SmartGate sends tariff pulse when call starts.

Call start and end (3) -2N® SmartGate sends tariff pulse when call starts and ends too.

Default setting: *None*

Tariff pulse frequency**Function No.: 112**

Tariff pulse frequency setting.

Setting options: *16 kHz (0) -2N® SmartGate transmits 16 kHz tariff pulses*

12 kHz (1)-2N® SmartGate transmits 12 kHz tariff pulses

Default setting: *16 kHz*

Tone settings

Dial tone – Double frequency tone[Hz]

Function No.: -

Parameter can be set for all three types of tone (Dial tone, Busy tone, Ringbacktone). This parameter is intended for switching between single tone and double tone setting. When the parameter is set, the second frequency of appropriate tone must be set too. When this parameter isn't set, the second frequency is automatically set to the same value, which results in single tone generation. This parameter can't be set using phone line programming. When the phone line programming is used for frequency change, both tones must be set (for single frequency to the same value).

Setting options: YES/NO

Default setting: NO

Dial tone – frequency 1[Hz]

Function No.: 120

Setting of frequency 1 of dial tone. This tone is generated after Off-Hook in case 2N® SmartGate is ready to accept dialing.

Setting options: 1-3400 Hz

Setting step: 1 HzD

Default setting: 425 Hz

Dial tone – frequency 2[Hz]

Function No.: 121

Setting of frequency 2 of dial tone.

Setting options: 1-3400 Hz

Setting step: 1 Hz

Default setting: 425 Hz

Dial tone - cadence

Function No.: 122

Dial tone cadence setting.

Setting options: Continuous (0) -2N® SmartGate generate continuous dial tone
Morse A (1) -2N® SmartGate generate dial tone with 330/330/660/660 ms timing

Default setting: Continuous

Busy tone – frequency 1[Hz]

Function No.: 123

Setting of frequency 1 of busy tone.

Setting options: 1-3400 Hz

Setting step: 1 Hz

Default setting: 425 Hz

Busy tone – frequency 2[Hz]

Function No.: 124

Setting of frequency 2 of busy tone.

Setting options: 1-3400 Hz

Setting step: 1 Hz

Default setting: 425 Hz

Busy tone - cadence**Function No.: 125**

Busy tone cadence setting.

Setting options: 330/330 ms (0) -cadence 330 ms tone, 330 ms pause
 200/200 ms (1) -cadence 200 ms tone, 200 ms pause
 250/250 ms (2) -cadence 250 ms tone, 250 ms pause
 375/375 ms (3) -cadence 375 ms tone, 375 ms pause
 500/500 ms (4) -cadence 500 ms tone, 500 ms pause

Default setting: 330/330 ms

Ring back tone – frequency 1 [Hz]**Function No.: 126**

Setting of frequency 1 of ringback tone. This tone is send after dialing end, before GSM network starts to generate its own Ringback tone.

Setting options: 1-3400 Hz
Setting step: 1 Hz
Default setting: 425 Hz

Ringback tone – frequency 2 [Hz]**Function No.: 127**

Setting of frequency 2 of ringback tone.

Setting options: 1-3400 Hz
Setting step: 1 Hz
Default setting: 425 Hz

Ringback tone - cadence**Function No.: 128**

Ringback tone cadence setting.

Setting options: OFF (0) -not generated, only network tone
 1000/4000 ms (1) -cadence 1 s tone, 4 s pause
 400/200/400/2000 ms (2) -cadence 2x400 ms tone, 2 s pause
 1500/3500 ms (3) -cadence 1,5 s tone, 3,5 s pause
 2000/4000 ms (4) -cadence 2 s tone, 4 s pause

Default setting: OFF

Tone after disconnection**Function No.: 129**

If the remote subscriber hangs up first, the 2N® SmartGate subscriber can hear the tone selected here.

Setting options: Busy (0)-2N® SmartGate transmits the busy tone upon call end.
 Permanent (1) -2N® SmartGate transmits the permanent tone upon call end.

Default setting: Busy tone

Volumes

Transmission volume**Function No.: 190**

Volume setting for GSM transmission with a 4 dB step.

Setting options: 1-5

Setting step: 1
 Default setting: 3 = medium volume level

Reception volume **Function No.: 191**

Volume setting for GSM reception with a 4 dB step.

Setting options: 1-5
 Setting step: 1
 Default setting: 3 = medium volume level

Ringing signal settings

Ringing signal – frequency [Hz] **Function No.: 140**

Ringing signal frequency setting.

Setting options: 25 / 50 Hz-2N® SmartGate rings with 50 or 25 Hz on FXS interface
 Default setting: 50 Hz

Ringing signal - cadence **Function No.: 141**

Ringing signal cadency setting.

Setting options: 1000/4000 ms (0) - 1 s ring, 4 s pause
 400/200/400/2000 ms (1)- 400ms ring, 200ms pause, 400ms ring, 2s pause
 1500/3500 ms (2) - 1,5 s ring, 3,5 s pause
 2000/4000 ms (3) - 2 s ring, 4 s pause
 Default setting: 1000/4000 ms

Ringing signal DATA/FAX - cadence **Function No.: 142**

Data/Fax ringing signal cadency setting.

Setting options: 1000/4000 ms (0) - 1 s ring, 4 s pause
 400/200/400/2000 ms (1)- 400ms ring, 200ms pause, 400ms ring, 2s pause
 1500/3500 ms (2) - 1,5 s ring, 3,5 s pause
 2000/4000 ms (3) - 2 s ring, 4 s pause
 Default setting: 1000/4000 ms

CLI transmitting **Function No.: 148**

Set this item to enable/disable identification of a telephone line calling from a GSM network. The function can be enabled if you have a device on your telephone line that is capable of receiving FSK according to ETSI standards.

Setting options: Disable (0) - 2N® SmartGate does not transmit the CLI.
 FSK during ringing (1) -2N® SmartGate transmits the FSK-based CLI according to the ETSI EN 300 659 standard (transmission during ringing).
 Default setting: Disable

Replace character + in CLI by	Function No.: 149
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If this parameter is filled, the + character in the international prefix of CLI is replaced by the defined string. The + character can neither be transmitted by the FSK protocol nor dialed by the DTMF from a terminal.

Setting options: 0-4 characters (0-9,*,#)

Default setting: blank

„BabyCall“ – Automatic call

BabyCall number	Function No.: 180
------------------------	--------------------------

A number to be dialed for the automatic call function. If this item is blank, the function is disabled.

Setting options: 0-20 characters (0-9,*,#,+)

Default setting: blank

BabyCall timeout [s]	Function No.: 181
-----------------------------	--------------------------

Time between line Off-Hook and automatic call beginning (if enabled). During this timeout 2N® SmartGate waits for dialing that cancels the automatic call. You can make standard call if the BabyCall function is enabled.

Setting options: 0-255 s

Setting step: 1 s

Default setting: 0 s

Telephone interface FXO parameters

Dialing parameters

Number of rings before Off-Hook	Function No.: 200
--	--------------------------

If 2N® SmartGate is programmed as FXO gateway, parameter sets the count of rings before Off-Hook.

Setting options: 1-255

Step: 1

Default setting: 1

Time for dialing start	Function No.: 202
-------------------------------	--------------------------

If 2N® SmartGate is programmed as FXO gateway, parameter defines timeout for first dialing digit. After timeout 2N® SmartGate hangs up the line.

Setting options: 1-255 s

Step: 1 s

Default setting: 15 s

Timeout for dialing end recognize [s]**Function No.: 201**

If 2N® SmartGate is programmed as FXO gateway, parameter defines timeout during which 2N® SmartGate waits for further digits to be dialed. It starts to establish connection when this timeout passes.

Setting options: 1-255 s

Setting step: 1 s

Default setting: 5 s

Type of transmitted dialing**Function No.: 204**

Set type of dialing for automatic dial-in from GSM and for dialing during outgoing call from FXS interface.

Setting options: DTMF (0)-2N® SmartGate transmits tone dialing-for future use

Default setting: DTMF

Minimal On-Hook [ms]**Function No.: 205**

Parameter defines minimal time of line On-Hook between calls. Set the parameter longer then duration of FLASH on your PBX.

Setting options: 100-25500 ms

Step: 100 ms

Default setting: 1500 ms

Maximal Off-Hook without dialing [s]**Function No.: 206**

Parameter defines maximal time of line Off-Hook before dialing to FXO interface during outgoing call from FXS interface. Set up shorter time then timeout from extension line Off-Hook and dialing receiver disconnection on your PBX. In this case PBX usually changes dial tone to busy tone. If defined timeout passes before dialing, 2N® SmartGate shortly hangs up, after that Off-hooks again and then dials.

Setting options: 1-255 s

Step: 1 s

Default setting: 15 s

DTMF during call**Function No.:**

When DTMF is transmitted in voice channel of GSM network problem with quality can occur, because the GSM compression can damage the signal. You can set digital transmission mode, than SmartGate mutes original DTMF signal from telephone line, and instead of this transmits digital DTMF in signaling channel. This function can't solve problems, when Easy Gate receives DTMF, it influences sending direction only and it is active only when Easy Gate originates the call.

Setting options: Analogue – DTMF transmission trough voice channel without change

Digital – DTMF is muted in voice channel and is transmitted digitally

Default setting: Analogue

Beep after dialing end**Function No.: 203**

If 2N® SmartGate is programmed as FXO gateway, parameter enables a beep to signal the end of dialing (beginning of outgoing call establishing).

Setting options: YES(1)/NO(0)

Default setting: YES

Signaling

Busy tone detection**Function No.: 210**

Set number of busy tone periods for detection of call disconnection from your PBX. The "0" setting disables busy tone detection. For reliable detection is recommended to use value 3 or more.

Setting options: 0-255

Step: 1

Default setting: 4

Continuous tone detection [ms]**Function No.: -**

Set duration of constant frequency continuous tone for detection of call disconnection from your PBX. The "0" setting disables continuous tone detection.

Setting options: 0-8900 ms

Step: 35 ms

Default setting: 2030 ms

Tone settings

Dial tone – Double frequency tone[Hz]**Function No.: -**

Parameter can be set for all three types of tone (Dial tone, Busy tone, Ringbacktone). This parameter is intended for switching between single tone and double tone setting. When the parameter is set, the second frequency of appropriate tone must be set too. When this parameter isn't set, the second frequency is automatically set to the same value, which results in single tone generation. This parameter can't be set using phone line programming. When the phone line programming is used for frequency change, both tones must be set (for single frequency to the same value).

Setting options: YES/NO

Default setting: NO

Dial tone – frequency 1[Hz]**Function No.: 220**

Setting of frequency 1 of dial tone. This tone is generated after Off-Hook in case 2N® SmartGate is ready to accept dialing.

Setting options: 1-3400 Hz

Setting step: 1 HzD

Default setting: 425 Hz

Dial tone – frequency 2[Hz]**Function No.: 221**

Setting of frequency 2 of dial tone.

Setting options: 1-3400 Hz*Setting step:* 1 Hz*Default setting:* 425 Hz**Dial tone - cadence****Function No.: 222**

Dial tone cadence setting.

Setting options: Continuous (0) -2N® SmartGate generate continuous dial tone
 Morse A (1) -2N® SmartGate generate dial tone with 330/330/660/660 ms timing

Default setting: Continuous**Ring back tone – frequency 1 [Hz]****Function No.: 226**

Setting of frequency 1 of ringback tone. This tone is send after dialing end, before GSM network starts to generate its own Ringback tone.

Setting options: 1-3400 Hz*Setting step:* 1 Hz*Default setting:* 425 Hz**Ringback tone – frequency 2 [Hz]****Function No.: 227**

Setting of frequency 2 of ringback tone.

Setting options: 1-3400 Hz*Setting step:* 1 Hz*Default setting:* 425 Hz**Ringback tone - cadence****Function No.: 228**

Ringback tone cadence setting.

Setting options:

OFF (0) -not generated, only network tone
 1000/4000 ms (1) -cadence 1 s tone, 4 s pause
 400/200/400/2000 ms (2) -cadence 2x400 ms tone, 2 s pause
 1500/3500 ms (3) -cadence 1,5 s tone, 3,5 s pause
 2000/4000 ms (4) -cadence 2 s tone, 4 s pause

Default setting: OFF

Volumes

Transmission volume**Function No.: 190**

See FXS interface parameters.

Reception volume**Function No.: 191**

See FXS interface parameters.

„BabyCall“ – Automatic call

BabyCall number

Function No.: 280

If 2N® SmartGate is programmed as FXO gateway, parameter defines a number to be dialed for the automatic call function. If this item is blank, the function is disabled. If only character '#' is included, after BabyCall timeout elapsed the interfaces FXO and FXS are connected and dialing to PSTN over FXO interface is possible.

Setting options: 0-20 characters (0-9,*,#,+)

Default setting: blank

BabyCall timeout [s]

Function No.: 281

If 2N® SmartGate is programmed as FXO gateway, parameter defines time between line Off-Hook and automatic call beginning (if enabled). During this timeout 2N® SmartGate waits for dialing that cancels the automatic call. You can make standard call if the BabyCall function is enabled.

Setting options: 0-255 s

Setting step: 1 s

Default setting: 0 s

Mobility extension FLASH

Mobility Extension FLASH DTMF code

Function No.: 240

Fill in DTMF code to enable GSM FLASH function. If 2N® SmartGate receive DTMF dialing corresponding to filled code during GSM - FXO call, it generates FLASH to FXO interface.

Setting options: 0-4 characters (0-9,*,#)

Default setting: blank

FLASH length [ms]

Function No.: 241

Time of current loop interruption (line On-Hook) during FLASH.

Setting options: 100-1500 ms

Step: 100 ms

Default setting: 100 ms

FXS routing table parameters

All parameters related to the dialed number and call routing are arranged in three routing tables. Each table pertains to one interface: FXS, FXO and GSM.

According to the prefix of dialed number on FXS interface you can:

- Bar the number to be dialed - the calling subscriber tone;
- Route the call to GSM network, or to PBX through the FXO interface;

- Accelerate connection establishing by knowing the number length for the given prefix;
- Accelerate connection establishing by allowing to terminate dialing with a #;
- Modify the number to be dialed by removing and/or adding prefix.
- Set tariff metering for the given prefix
- Set time limit for call
- Bar the number to be dialed - the calling subscriber tone;
- Route the call to GSM network, or to PBX through the FXO interface;
- Accelerate connection establishing by knowing the number length for the given prefix;
- Accelerate connection establishing by allowing to terminate dialing with a #;
- Modify the number to be dialed by removing and/or adding prefix.
- Set tariff metering for the given prefix
- Set time limit for call

Call tables											
FXS routing table FXD routing table GSM routing table Free minutes bank - FW 1.5x and 3.5x only											
FXS routing - global parameters											
Operator for Integra <input type="text"/>											
Row	Prefix	Enable	Route to	Length	End with #	Remove	Add	Extra tariff	Tariff [s]	Time limit [min]	Bank No.
1.	00	Yes	GSM	0	No	0		0	0	0	0
2.	00421	Yes	FXD	14	No	0		0	0	0	0
3.		Yes	GSM	0	No	0		0	0	0	0
4.		Yes	GSM	0	No	0		0	0	0	0
5.		Yes	GSM	0	No	0		0	0	0	0
6.		Yes	GSM	0	No	0		0	0	0	0
7.		Yes	GSM	0	No	0		0	0	0	0
8.		Yes	GSM	0	No	0		0	0	0	0
9.		Yes	GSM	0	No	0		0	0	0	0
10.		Yes	GSM	0	No	0		0	0	0	0
11.		Yes	GSM	0	No	0		0	0	0	0
12.		Yes	GSM	0	No	0		0	0	0	0
13.		Yes	GSM	0	No	0		0	0	0	0
14.		Yes	GSM	0	No	0		0	0	0	0
15.		Yes	GSM	0	No	0		0	0	0	0
16.		Yes	GSM	0	No	0		0	0	0	0
17.		Yes	GSM	0	No	0		0	0	0	0
18.		Yes	GSM	0	No	0		0	0	0	0
19.		Yes	GSM	0	No	0		0	0	0	0
20.		Yes	GSM	0	No	0		0	0	0	0
21.		Yes	GSM	0	No	0		0	0	0	0
22.		Yes	GSM	0	No	0		0	0	0	0
...											
Other prefixes		Yes	GSM	0	No	0		0	0	0	0

Every table line includes a phone number prefix (of variable length) and other parameters. The parameters define SmartGate's behavior in case the beginning of the dialed number matches this prefix on the same table row. The table contains 120 rows for up to 120 different prefixes.

There may be exceptions to the rule - a number may start with the same digits but has to be served in a different way. Any table row that starts with the same prefix followed by one or more digits is considered an exception of the line with shorter prefix.

Remember to complete the "Other prefixes" line for a number whose prefix is not found in the table.

An example in the figure shows how to bar all international calls with the exception of calls to Slovakia. Calls to Slovakia are routed through FXO interface and the call is established immediately after 14 digits are dialed. All other calls are enabled and they are routed to GSM network. Their tariff is one impulse every 30 second and you can accelerate connection establishing by dialing of a # after the dialed number. Maximal length of the call is 10 minutes.

Operator for Integra

Function No.: 405

In some GSM networks you can add to dialed number # character and PBX subscriber number. Subscriber number is displayed on other side together with CLI. This parameter take place when dialed number doesn't contain # character. Common parameter for both FXO and FXS port.

Setting options: 0-8 characters (0-9)

Default setting: blank



Caution!

- Configuration using phone line programming (DTMF) is applicable for line 'Other prefixes' only.

Prefix

Function No.: -

Dialed number prefix identifying the call type. "Other numbers" line is used for calls with prefixes that are not included in the table.

Setting options: 0-16 characters (0-9,,#)*

Default setting: blank

Call enable

Function No.: 391

This parameter allows/bars calls with corresponding prefixes.

Setting options: YES(1)/NO(0)

Default setting: YES

Route to

Function No.: 392

The Remove parameter is used for automatic call routing. A defined count of digits (prefix) is removed from the number beginning.

Setting options: 0-20

Setting step: 1

Default setting: 0

Number length

Function No.: 393

The parameter defines the expected length of dialed number. It enables to start dialing into GSM or FXO interface immediately after the last digit is dialed. If the telephone number to be dialed is shorter, a timeout is respected. The "0" setting means that the function is disabled.

Setting options: 0, 3-15

Setting step: 1

Default setting: 0

End with #**Function No.: 394**

This parameter enables to establish the call when a # is received. The # character is removed from the dialed number. If a # should be part of the dialed number, this function cannot be used for the given prefix.

Setting options: YES(1)/NO(0)

Default setting: NO

Remove**Function No.: 395**

The Remove parameter is used for automatic call routing. A defined count of digits (prefix) is removed from the number beginning.

Setting options: 0-20

Setting step: 1

Default setting: 0

Add**Function No.: 396**

The Add parameter is used for automatic call routing. A defined string (prefix) is added to the beginning of the number to be dialed.

Setting options: 0-16 characters (0-9,*,#,+)

Default setting: blank

Extra tariff**Function No.: 397**

Pseudo tariff metering setting (tariff is based on call duration) for GSM calls. Connected PBX must send tariff metering pulses for FXO calls. The Extra tariff parameter defines transmitting of fixed quantity of tariff pulses after call start. This parameter sets minimal call cost.

Setting options: 0-255

Setting step: 1

Default setting: 0

Tariff [s]**Function No.: 398**

Pseudo tariff metering setting (tariff is based on call duration) for GSM calls. Connected PBX must send tariff metering pulses for FXO calls. The Tariff parameter sets the call cost according to call duration. Set how often in seconds do you want to transmit pulses. Smaller number means more expensive call. 0 means not to transmit pulses according to call duration.

Setting options: 0-255 s

Setting step: 1 s

Default setting: 0 sFAX/DATA routing parameters

Time limit [min]**Function No.: 399**

After time elapsing is call connection terminated immediately. You can hear beep 30s before end of call. 10s before end you can hear beep every second. The "0" setting means that the function is disabled.

Setting options: 0-255 min

Setting step: 1 min

Default setting: 0 min

Bank No.

Special option for gateways with Free minutes option support. This option is for gateways with FW version 1.5x and 3.5x only and it is described in separate part of manual.

FXO routing table parameters

All parameters related to the dialed number and call routing are arranged in three routing tables. Each table pertains to one interface: FXS, FXO and GSM.

Calls from FXO interface are routed according to "FXO calls rote to" parameter. You can set 2N® SmartGate as DialThru gateway or as gateway for extension line of PBX.

You can program ME function for the DialThru gateway.

For gateway for extension line of PBX you can fill in the FXO routing table. According to the prefix of dialed number on FXO interface you can:

- Bar the number to be dialed – 2N® SmartGate hangs up, the call isn't established;
- Accelerate connection establishing by knowing the number length for the given prefix;
- Accelerate connection establishing by allowing to terminate dialing with a #;
- Modify the number to be dialed by removing and/or adding prefix.

The principle of table function is the same as in the FXS routing table. The call is controlled according to parameters on the row with dialed number prefix match. Remember to fill in the "Other prefixes" line for a number whose prefix is not found in the table.

FXO calls route to**Function No.: 400**

The main parameter for FXO calls routing. You can program 2N® SmartGate as DialThru gateway, or as gateway for extension line of PBX.

DialThru gateway: Incoming ringing is immediately connected to FXS interface. If function ME set, 2N® SmartGate starts to establish GSM call to ME number after defined number of rings. Routing table FXO is not active.

Gateway for extension line of PBX: 2N® SmartGate detects incoming ringing and Off-Hook the line after programmed number of rings, if it is possible to make call to GSM. 2N® SmartGate generate dial tone and after dialing takes an action according to FXO routing table.

Setting options: *FXS - DialThru gateway (0)*
 GSM - gateway for extension line of PBX (1)

Default setting: *FXS - DialThru gateway*

Mobility Extension number**Function No.: 401**

If you program 2N® SmartGate as DialThru gateway, fill in telephone number for ME function. 2N® SmartGate starts to establish GSM call to ME number after defined number of rings. Then you can receive incoming FXO call on telephone line or in GSM network. Blank parameter disables ME function.

Setting options: 0-16 characters (0-9,*,#,+)
 Default setting: blank

Mobility Extension - number of rings **Function No.: 402**

If you program 2N® SmartGate as DialThru gateway and ME number is filled in, 2N® SmartGate starts to establish GSM call to ME number after defined number of rings. Then you can receive incoming FXO call on telephone line or in GSM network.

Setting options: 0-255
 Step: 1
 Default setting: 1

Mobility Extension - password for activation / disabling **Function No.: 403**

If you program 2N® SmartGate as DialThru gateway and fill in ME number, function ME is active. If you fill in password for ME activation/disabling, you can activate/disable function ME without PC programming.

Off-Hook FXS line and dial PASSWORD plus  to disable the function.

Off-Hook FXS line and dial PASSWORD plus  to activate the function again.

Setting options: 0-8 characters (0-9)
 Default setting: blank

Operator for Integra **Function No.: 405**

In some GSM networks you can add to dialed number # character and PBX subscriber number. Subscriber number is displayed on other side together with CLI. This parameter take place when dialed number doesn't contain # character. Common parameter for both FXO and FXS port.

Setting options: 0-8 characters (0-9)
 Default setting: blank

DTMF code for On-Hook **Function No.: 409**

Using this code, you can terminate call to GSM network, if busy tone detection on 2N® SmartGate fails, or if connected equipment doesn't transmit busy tone.

Setting options: 0-8 characters (0-9,*,#)
 Default setting: blank



Caution

- Configuration using phone line programming (DTMF) is applicable for line 'Other prefixes' only.

Prefix **Function No.: -**

Dialed number prefix identifying the call type. "Other numbers" line is used for calls with prefixes that are not included in the table.

Setting options: 0-16 characters (0-9,*,#)
Default setting: blank

Call enable**Function No.: 491**

This parameter allows/bars calls with corresponding prefixes.

Setting options: YES(1)/NO(0)
Default setting: YES

Number length**Function No.: 493**

The parameter defines the expected length of dialed number. It enables to start dialing into GSM or FXO interface immediately after the last digit is dialed. If the telephone number to be dialed is shorter, a timeout is respected. The "0" setting means that the function is disabled.

Setting options: 0, 3-15
Setting step: 1
Default setting: 0

End with #**Function No.: 494**

This parameter enables to establish the call when a # is received. The # character is removed from the dialed number. If a # should be part of the dialed number, this function cannot be used for the given prefix.

Setting options: YES(1)/NO(0)
Default setting: NO

Remove**FunctionNo.: 495**

The Remove parameter is used for automatic call routing. A defined count of digits (prefix) is removed from the number beginning.

Setting options: 0-20
Setting step: 1
Default setting: 0

Add**Function No.: 496**

The Add parameter is used for automatic call routing. A defined string (prefix) is added to the beginning of the number to be dialed.

Setting options: 0-16 characters (0-9,*,#,+)
Default setting: blank

Time limit [min]**Function No.: 499**

After time elapsing is call connection terminated immediately. You can hear beep 30s before end of call. 10s before end you can hear beep every second. The "0" setting means that the function is disabled.

Setting options: 0-255 min
Setting step: 1 min
Default setting: 0 min

Bank No.

Special option for gateways with Free minutes option support. This option is for gateways with FW version 1.5x and 3.5x only and it is described in separate part of manual.

GSM routing table

All parameters related to the dialed number and call routing are arranged in three routing tables. Each table pertains to one interface: FXS, FXO and GSM.

Incoming calls from GSM contain the CLI. According to received CLI 2N® SmartGate can do following:

- Reject the call;
- Route the call to FXS or FXO interface;
- Automatic dial in. 2N® SmartGate dials preprogrammed PBX subscriber number (for example switchboard operator) to be connected with calling GSM subscriber.

FXS line Off-Hook to DISA timeout [ms] Function No.: 500

Timeout between FXS line Off-Hook and automatic dial in according to parameter "Dial in" in the table.

Setting options: 100-25500 ms

Setting step: 100 ms

Default setting: 2000 ms

FXO line Off-Hook to dial-in timeout [ms] Function No.: 501

Timeout between FXS line Off-Hook and automatic dial in according to parameter "Dial in" in the table.

Setting options: 100-25500 ms

Setting step: 100 ms

Default setting: 1000 ms

Max. ring time for Callback Function No.: 502

Parameter sets up a behaviour for Callback function. You've got 2 options how to use a Callback on the FXS port:

Simple Callback - set up for 0. During an incoming call the FXS port gives a ringing. When the FXS port is off-hooked an incoming call from GSM is rejected and after 10s the gateway calls back the GSM number. During those 10s the caller must hang up to be ready for answering the callback call. On the FXS port a melody is played.

Advanced Callback - set up for 1-255. During an incoming call the FXS port gives a ringing. If the caller wants to use a callback functionality he/she must hang up before the parameter Max. ring time for Callback runs out. The gateway then calls back immediately. If the call is answered on the analog side earlier the called party hears the melody. If the call is answered on the GSM side first then the calling party number hears the melody. If the caller doesn't want to use the

Callback he just doesn't hang up and the call is handled as a standard incoming call.

Setting options: 0-255 s

Setting step: 1 s

Default setting: 5 s

FAX from GSM route to

Function No.: 509

Incoming FAX call from GSM network you can route to telephone line FXS, or to COM (PCFax). Parameter takes place only on models with FAX converter, on other models FAX calls are routed always to COM.

Setting options: FXS line - Incoming FAX call is routed to FAX machine on FXS line.

COM - Incoming FAX call is routed to COM

Default setting: FXS line

DATA from GSM route to

Function No.: 508

Incoming DATA call from GSM network you can route to telephone line FXS, or to COM. Parameter takes place only on models with FAX/DATA converter, on other models DATA calls are routed always to COM.

Setting options: FXS line - Incoming DATA call is routed to modem on FXS line.

COM - Incoming DATA call is routed to COM

Default setting: FXS line



Caution

- Configuration using phone line programming (DTMF) is applicable for line 'Other prefixes' only.

CLI – calling number

Function No.: -

Fill in CLI, to route the call according to parameter on the same table line. It is possible to fill in only prefix for group of CLI's. If parameter "Substring" = 0, you must fill prefix as you see it on display of your mobile phone - It means inclusive of + and international prefix if they are included. If parameter "Substring" > 0, 2N® SmartGate searches filled prefix as substring of the received CLI, but max. to position given by "Substring" parameter. Positions are counted from zero. See examples in "Substring" parameter hint.

Setting options: 0-16 characters (0-9,,#,+)*

Default setting: blank

Substring

Function No.: -

Parameter is used to make filling CLI prefix easier. If parameter "Substring" > 0, 2N® SmartGate searches filled prefix as substring of the received CLI, but max. to position given by "Substring" parameter. Positions are counted from zero.

for example received CLI +420603198222 corresponds with settings:

CLI - calling number

+420603198222
+420603

Substring

any setting
any setting

+420 any setting
 603198222 4, or more
 603 4, or more

Setting options: 0-15
Step: 1
Default setting: 0

Route to Function No.: 591

It is possible to route incoming GSM call to FXS or FXO interface, or reject it. When the call is routed to FXS port you can use the CallBack feature. For correct functionality please set up "Max. ring time for Callback" parameter.

Setting options: FXS -incoming call is routed to FXS
 FXO -incoming call is routed to FXO
 FXS CallBack -incoming call is routed to FXS with
 CallBack functionality
 reject -incoming call is rejected

Default setting: FXS

Dial in Function No.: 592

Parameter "Dial in" is used for automatic connection to switchboard operator, or directly to other subscriber. If this parameter is blank, calling person has telephone line fully at disposal and has to dial the subscriber number by DTMF. You can fill only # character to disable Integra function.

Setting options: 0-16 characters (0-9,*,#)
Default setting: blank

Time limit [min] Function No.: 599

After time elapsing is call connection terminated immediately. You can hear beep 30s before end of call. 10s before end you can hear beep every second. The "0" setting means that the function is disabled.

Setting options: 0-255 min
Setting step: 1 min
Default setting: 0 min

SMS Sending Input Parameters

Telephone number for SMS Function No.:600

The telephone number to which an SMS is sent upon SMS input activation. If blank, the function is off.

Setting options: 0-16 characters (0-9,*,#,+)
Default setting: blank

SMS text Function No.: -

The SMS text to be sent to the preset telephone number. If the SMS text is blank, SMS with signal strength is sent.

Setting options: 0-40 characters
Default setting: blank

Send if activated longer than [ms] Function No.: 601

Set the SMS activation time necessary for SMS sending. This parameter prevents SMS sending in the event of short-time activation. If a "0" is selected, SMS is sent immediately upon the input activation.

Setting options: 0-25500 ms

Setting step: 100 ms

Default setting: 0 ms

Timeout after sending [s] Function No.: 602

Set the Time of inactivity after SMS sending. During this timeout no SMS is sent even if the SMS input gets activated. This prevents sending multiple SMS units in the case of repeated activation of the input.

Setting options: 0-2550 s

Setting step: 10 s

Default setting: 0 s

GSM & SIM Parameters

Blocked for operator Function No.: -

Provider blocking is set by manufacturer in SmartGate. If 2N® SmartGate is blocked to a GSM provider, no other GSM provider's SIM card can be used. If an unacceptable SIM card is used, the GSM module does not register to GSM and the GSM network LED flashes quickly on the 2N® SmartGate panel.

CLIR - incognito Function No.: 701

Sets the calling line identification restriction (CLIR) for outgoing calls from SmartGate. Attention, before enabling it is necessary to activate this feature by GSM operator, otherwise outgoing calls can be rejected by GSM network.

Setting options: -According to provider (0) - depending on how the function is selected in the GSM network
 -Activation (1) - ID is not sent.
 -Suppression (2) - ID is always sent.

Default setting: According to provider

Roaming enable/disable Function No.: 702

You can make 2N® SmartGate work even if it is registered to a foreign GSM network.

Setting options: -Disable (0) -The GSM module logs out of a foreign network and attempts to register again in within 5 minutes.
 -Enable (1) - 2N® SmartGate works in any GSM network.

Default setting: Disable

Call Handover workaround**Function No.: 703**

This parameter offers a workaround to prevent problems during call handover into the 1900 MHz (or 1800 MHz) band, caused by non-conforming configurations of the 1900 MHz (or 1800 MHz) GSM network.

Setting options: -Disable (0) - Disable workaround.
 -Enable (1) - Enable workaround. Select only when handover into a 1800/1900MHz band fails.

Default setting: Disable

GPRS APN**Function No.: -**

GPRS APN (Access Point Name) for automatic setting.

Setting options: 0-40 characters

Default setting: blank

Wireless Network selection**Function No.: -**

For UMTS gateways only. You can specify network technology to be used.

Setting options: - UMTS & GSM - automatic selection, UMTS preferred
 - UMTS only
 - GSM only

Default setting: UMTS & GSM

AMR Enable**Function No.: -**

You can disable AMR (Adaptive Multi Rate) on GSM module to improve voice quality in some GSM networks.

Setting options: - Enable
 - Disable

Default setting: Enable

Call transfer in virtual GSM PBX**Function No.: -**


This is cliental function and it depends on GSM network support. Parameters are common for FXO and FXS interface.

Function modifies behavior during established voice call to GSM network. After FLASH detection during the call gateway place the call on hold. You can hear dial tone on the telephone line and the gateway is waiting for dialing. Dialed number is send to GSM together with service prefix filled in the next parameter. Call transfer is finished after on-hook detection on the telephone line. You can return to first call by FLASH, the second call will terminate. If you delay before the second number dialing, you will return to the first call too. For this function is network support needed.

Setting options: - Enable
 - Disable

Default setting: Disable

FLASH emulation by DTMF**Function No.: -**

On the FXS interface you can generate FLASH by short loop disconnection. On FXO interface it is necessary to emulate FLASH by DTMF dialing of  character. If enabled, the FLASH emulation works on FXS interface too. Emulation is active only if the call transfer function is active.

Telephone number for service SMS	Function No.: 714
---	--------------------------

Telephone number for service SMS. The number is common for GGMC SMS and "LOW CREDIT" SMS on prepaid SIM cards.

Setting options: 0-16 characters (0-9, *, #, +)

Default setting: blank

Service Parameters

Hardware version	Function No.: -
-------------------------	------------------------

2N® SmartGate hardware version - for information only (cannot be modified). Must be used for communication with the manufacturer.

Firmware version	Function No.: -
-------------------------	------------------------

2N® SmartGate firmware version - 2N® SmartGate central processor program version. The manufacturer can issue upgrades to extend functions. To load new firmware into 2N® SmartGate use the Upgrade function. Keep communicating with the manufacturer.

Serial number	Function No.: -
----------------------	------------------------

2N® SmartGate serial number - for information only (cannot be changed). Must be used for communication with the manufacturer.

Blocked by operator	Function No.: -
----------------------------	------------------------

Refer to GSM & SIM Parameters.

COM enable	Function No.: 960
-------------------	--------------------------

With this parameter you can enable/disable the serial interface function. You can disable communication in the operating mode, maintaining the special programming mode after power up.

Setting options: YES(1)/NO(0)

Default setting: YES

Time limit for data connections [min]	Function No.: -
--	------------------------

After time elapsing is data/fax connection terminated immediately without warning. The "0" setting means that the function is disabled.

Setting options: 0-255 min

Setting step: 1 min

Default setting: 0

Time period for GGMC SMS [h]	Function No.: 970
-------------------------------------	--------------------------

Time interval for GGMC SMS sending. GGMC = GSM Gateway Monitoring Centre. The "0" setting means that the function is disabled.

Setting options: 0-255 h

Step: 1 h

Default setting: 0

Telephone number for service SMS	Function No.:714
---	-------------------------

Telephone number for service SMS. The number is common for GGMC SMS and "LOW CREDIT" SMS on prepaid SIM cards.

Setting options: 0-16 characters (0-9,*,#,+)

Default setting: blank

Initialization

All programmable parameters are arranged in tables according to their functions. You can initialize either all parameters at once or one table of parameters.

Telephone line initialization FXS	Function No.: -
--	------------------------

Initialization of all parameters necessary for the telephone line FXS.

Telephone line initialization FXO	Function No.: -
--	------------------------

Initialization of all parameters necessary for the telephone line FXO.

Call table initialization FXS	Function No.: -
--------------------------------------	------------------------

Initialization of all parameters related to FXS routing table.

Call table initialization FXO	Function No.:
--------------------------------------	----------------------

Initialization of all parameters related to FXO routing table.

Call table initialization GSM	Function No.: -
--------------------------------------	------------------------

Initialization of all parameters related to GSM routing table.

Initialization of GSM & SIM	Function No.: -
--	------------------------


Initialization of all parameters related to the GSM network and SIM card (except the PIN code).

SMS input initialization	Function No.: -
---------------------------------	------------------------

Initialization of all parameters for SMS sending upon SMS input activation.

Global initialization	Function No.: 999
------------------------------	--------------------------

Initialization of all 2N® SmartGate parameters including the PIN and service password.

Only Global initialization can be done by phone line programming. As parameter of this function service password followed by  must be used. This operation isn't followed by confirmation tone. Successful setting is followed by pause (aprox.10s), during this time period is performed reset of configuration memory. Than is the gateway restarted.

Security Parameters

PIN – value**Function No.: 700**

Fill in the PIN value for automatic PIN entering upon 2N® SmartGate power up. It is applied only if the SIM card is PIN secured. If the given PIN fails to match the SIM, it is deleted automatically. If entered via a telephone line upon 2N® SmartGate start, the PIN is stored automatically.

Setting options: 0, 4-8 characters (0-9)

Upon full initialization: blank

Service password**Function No.: 900**

Fill the service password for programming via a telephone line. Some parameters can be programmed by DTMF dialing and so the access to programming must be password-protected.

Setting options: 4-8 characters (0-9)

Upon full initialization: 12345

4

Function and Use

This section describes the basic and extending functions of the product **2N® SmartGate** .

Here is what you can find in this section:

- Voice function
- FAX and Data function
- SMS Sending Input
- COM – Serial Interface
- SIM Card PIN protection.

4.1 Voice function

Outgoing and incoming call establishing procedures is for illustration described for analog phone connected to FXS interface and extension line of PBX connected to FXO interface on SmartGate. In case of other equipment connection, please check SmartGate's function by connecting a phone.

Suppose that a SIM card has been inserted, the PIN code entered or not required, the antenna connected and 2N® SmartGate registered to GSM network – the GSM network LED is permanently on and you can hear the dial tone upon line off-hook.

DialThru gateway

Extension line of PBX is connected to FXO interface and phone is connected to FXS interface on SmartGate.

Outgoing call on FXS interface

1. Hook off the telephone, you can hear the dial tone and the Line LED starts flashing.
2. Dial the required subscriber number. 2N® SmartGate receives tone dialing (DTMF) by default. If your telephone transmits pulse dialing only, program 2N® SmartGate to receive pulse dialing. The delay between dialed digits may not exceed 5 s (programmable parameter). The number is evaluated as complete after this timeout.
3. A short delay follows the last-dialed digit for 2N® SmartGate to await further dialing. Then, the dialing end is signaled and connection is established.
4. Prefix of dialed number is compared with filled rows of FXS routing table. The call is rejected, routed to GSM network or to FXO interface according to the routing table.
5. If the called subscriber is available, you can hear the ringing tone. If not, you can hear the busy tone or any of the GSM provider's messages.
6. When the called subscriber answers the call, a call is established. The Line LED is permanently on during the call (Orange for calls to GSM. Green-Orange alternate for FXS-FXO calls).
7. Hang up to terminate the call. The Line LED goes off. If the called subscriber hangs up first, you can hear the busy tone.

Incoming call from GSM network

1. The CLI is compared with filled rows of GSM routing table. The call is rejected, routed to FXS interface – connected phone, or to FXO interface according to the routing table. Routing to FXO interface isn't usually used in case of DialThru gateway.
2. Ringing on FXS interface signals incoming call. The Line LED flashes during ringing. If programmed so, 2N® SmartGate transmits the CLIP by FSK between the first and second rings. Advanced telephone sets are able to display the CLI.
3. Hook off the phone to establish the call. The Line LED is permanently on during the call.
4. Hang up to terminate the call. The Line LED goes off. If the called subscriber hangs up first, you can hear the busy tone.

Incoming call on FXO interface

1. 2N® SmartGate detects a ringing signal and immediately interconnects it to FXS interface – the phone starts to ring.
2. The CLIP transmitting must provide connected PBX.
3. If you hook off the phone the call is established.

Automatic Call ("BabyCall")

If the BabyCall function is enabled on FXS interface, a pre-programmed timeout is counted down after off-hook. If you don't start dialing within this timeout, 2N® SmartGate signals dialing end and starts to establish a call to the pre-programmed number using GSM network automatically – from now 2N® SmartGate behaves as if a standard outgoing call to GSM had been established. Any dialing during the BabyCall timeout cancels this function and a standard outgoing call can be made.

ME- Mobility Extension

ME function takes place during ringing on FXS interface if 2N® SmartGate is programmed as DialThru gateway.

Fill in telephone number for ME function and number of rings to ME function start on FXO routing table sheet.

1. 2N® SmartGate detects a ringing signal and immediately interconnects it to FXS interface – the phone starts to ring.
2. If there is no call connection before the pre-programmed number of rings, 2N® SmartGate simultaneously establishes call to GSM network. Some timeout take place between GSM call establishing start and ringing of mobile phone.
3. As long as 2N® SmartGate detects ringing on FXO interface, connected analog and GSM phones ring.
4. You can receive the call on analog line as well as on your mobile phone.
5. During call received on mobile phone you can send FLASH to PBX, for special PBX functions, by preprogrammed DTMF code.

If you want repeatedly temporarily disable and afterwards enable the ME function, fill in Password for ME activation/disabling. If password is filled in:

1. Hook off the phone.
2. For temporarily disabling the function dial the password and confirm by .
- For activation the function dial the password and confirm by .
3. Hang up.

Tariff pulses 16 or 12 kHz

2N® SmartGate has tariff pulse transmitter on FXS interface. You can use tariff pulses for outgoing call pricing. 2N® SmartGate offer pseudotariff only – tariff metering doesn't correspond to real price of call, tariff pulses are transmitted according to programmed parameters and call duration. You must program specific parameters in FXS routing table to set tariff metering for different prefixes of dialed

numbers. Tariff metering is transmitted only during calls to GSM network. Connected PBX must provide the tariff metering during calls to FXO interface.

You can also program 2N® SmartGate to transmit tariff pulses as call connect/disconnect signaling if your PBX cannot receive telephone line polarity reversal signaling.

Gateway for extension line of PBX

Extension line of PBX is connected to FXO interface on SmartGate. FXS interface remains unconnected.

You have to program parameter "FXO call route to" for proper function on FXO interface. You can fill in some rows in FXO routing table to reject given calls, for automatic call routing etc.

Fill in GSM routing table to route an incoming GSM calls to FXO interface.

It is necessary to set up conditions for call-disconnect detection from PBX. If 2N® SmartGate detects busy tone or continuous tone from PBX, it disconnects the established GSM call.

Outgoing call on FXO interface

1. 2N® SmartGate detects a ringing signal from PBX and, if it is possible to establish GSM call, it hooks off the line after preprogrammed number of rings. 2N® SmartGate transmits dial tone and green LED for line starts flashing.
2. Dial the GSM subscriber number using DTMF. The delay between dialed digits may not exceed 5 s (programmable parameter). The number is evaluated as complete after this timeout.
3. A short delay follows the last-dialed digit for 2N® SmartGate to await further dialing. Then, the dialing end is signaled and connection is established.
4. Prefix of dialed number is compared with filled rows of FXO routing table. The call is rejected or routed to GSM network according to the routing table.
5. If the called subscriber is available, you can hear the ringing tone. If not, 2N® SmartGate hangs up.
6. When the called subscriber answers the call, a call is established. The green Line LED is permanently on during the call.
7. Hang up to terminate the call. PBX sends busy tone to SmartGate's subscriber line, 2N® SmartGate detects it and disconnects the GSM call.

Incoming call from GSM network

1. The CLI is compared with filled rows of GSM routing table. The call is rejected, or routed to FXO interface – extension line of PBX according to the routing table.
2. 2N® SmartGate hooks off the line. If there is filled in the "Dial in" parameter for given CLI, 2N® SmartGate dials it using DTMF.
3. The GSM subscriber hears the ringing tone from PBX if the automatic dial in function was applied, if not he hears dial tone from PBX and he can dial required extension himself.
4. The call termination is the same as in case of outgoing call.

Gateway for trunk line of PBX

Outgoing and incoming call establishing procedures is for illustration described for analog phone connected to FXS interface. The rules for call establishing in case of trunk line connection are the same, you have to program your PBX to route GSM calls to SmartGate. We strongly recommend to check SmartGate's function by connecting a phone in case of interconnection with PBX trunk line.

Outgoing call on FXS interface

1. Hook off the telephone, you can hear the dial tone and the orange Line LED starts flashing.
2. Dial the required GSM subscriber number. 2N® SmartGate receives tone dialing (DTMF) by default. If your telephone transmits pulse dialing only, program 2N® SmartGate to receive pulse dialing. The delay between dialed digits may not exceed 5 s (programmable parameter). The number is evaluated as complete after this timeout.
3. A short delay follows the last-dialed digit for 2N® SmartGate to await further dialing. Then, the dialing end is signaled and connection is established.
4. Prefix of dialed number is compared with filled rows of FXS routing table. The call is rejected, or routed to GSM network according to the routing table.
5. If the called subscriber is available, you can hear the ringing tone. If not, you can hear the busy tone or any of the GSM provider's messages.
6. When the called subscriber answers the call, a call is established. The orange Line LED is permanently on during the call.
7. Hang up to terminate the call. The Line LED goes off. If the called subscriber hangs up first, you can hear the busy tone.

Incoming call from GSM network

1. The CLI is compared with filled rows of GSM routing table. The call is rejected, or routed to FXS interface – connected phone according to the routing table.
2. Ringing on FXS interface signals incoming call. The orange Line LED flashes during ringing. If programmed so, 2N® SmartGate transmits the CLIP by FSK between the first and second rings. Advanced telephone sets are able to display the CLI.
3. Hook off the phone to establish the call. The Line LED is permanently on during the call.
4. Hang up to terminate the call. The Line LED goes off. If the called subscriber hangs up first, you can hear the busy tone.

Configuration of network services

2N® SmartGate provides some of network services to improve possibility of usage. The configuration is done by standard Star-Hash codes you can know from mobile phones.

To configure these services:


1. Hook off the telephone, you can hear the dial tone.
2. Enter the Star-Hash code described below.

3. Wait for information tone. You may wait about 3 seconds.
4. Hook on.

Information tones:

Confirmation - OK: 

- Confirms that the service was configured correctly.

Confirmation - bad: 

- Service was not correctly configured
- Service isn't activated by your provider

Confirmation - service activated: 

- Confirms that the service was configured correctly and the service is activated.

Confirmation - service deactivated: 

- Confirms that the service was configured correctly and the service is deactivated.

Call forwarding

For forwarding activation you must specify <Telephone number> the calls will be forwarded to. You may specify <Call type>, if you want to forward specified call type only. You may specify <Delay time> in seconds for forwarding if no answer too.

Description of <Call type> field codes:

Voice:  







Data:  

Fax:  





Call forwarding unconditional

If activated, incoming calls will be always forwarded to the configured telephone number.

Activation for all call types:

     <Telephone number> 

Activation for selected call type:

     <Telephone number>  <Call type> 

Deactivation:

2 1

Status check:

* # 2 1 #

Call forwarding if busy

If activated, incoming calls will be forwarded to the configured telephone number if there is call in progress on SmartGate.

Activation for all call types:

* * 6 7 * <Telephone number> #

Activation for selected call type:

* * 6 7 * <Telephone number> * <Call type> #

Deactivation:

6 7

Status check:

* # 6 7 #

Call forwarding if no answer

If activated, incoming calls will be forwarded to the configured telephone number if incoming call isn't answered during specified timeout. Default timeout is 20 seconds.

Activation for all call types:

* * 6 1 * <Telephone number> #

Activation for selected call type:

* * 6 1 * <Telephone number> * <Call type> #

Activation for all call types and specified delay time:

* * 6 1 * <Telephone number> * * <Delay time> #

Activation for selected call type and specified delay time:

* * 6 1 * <Telephone number> * <Call type> * <Delay time> #

Deactivation:

6 1

Status check:

*#61#

Call forwarding if not accessible

If activated, incoming calls will be forwarded to the configured telephone number if your 2N® SmartGate is not accessible in the GSM network.

Activation for all call types:

#62 <Telephone number> #

Activation for selected call type:

#62 <Telephone number> * <Call type> #

Deactivation:

#62#

Status check:

*#62#

Call waiting

If the call waiting is activated the incoming call isn't refuse if there is call in progress on SmartGate. If there is the other incoming call during connected call it will be indicated by tone. See 0. for multiple calls management.

Activation:

*43#

Deactivation:

#43#

Status check:

*#43#

Call hold

Check if your network supports the service before you use it.

This service relates to Call waiting described in 0. If there is call waiting on the line, you have more possibilities what to do. Every action is made by FLASH and DTMF code:

To terminate all held calls, or reject waiting call dial:



To terminating active call and accept the held or waiting call dial:



To place the active call on hold and accept the held or waiting call (switching between two calls) or

To place the active call on hold to have possibility to dial other outgoing call dial:



To place all held calls to active calls and set up conference call dial:



To connect the two calls (active and held) and disconnect the 2N® SmartGate from both calls dial:



4.2 FAX and Data function

Only 2N® SmartGate with fax converter supports fax and data functions.

Sending fax message or modem connection to and from PSTN

FAX and data call to PSTN routed from FXS to FXO interface (DialThru gateway) works on every model and needn't any other settings.

Sending fax message or modem connection to and from GSM

GSM fax and Data connection

2N® SmartGate with fax converter has ability to send and receive GSM fax messages using analogue fax Group 3 connected to telephone line FXS. The fax communication service must be registered with your GSM operator. It is possible to establish data connection using analog modem connected to FXS line. **It is useful for devices with build-in modem, without possibility to use serial line.** The data communication service must also be registered with your GSM operator.

Sending a fax message to GSM and modem connection through GSM

When connected device is able to send CNG tone (1100Hz for fax 1300Hz for modem), the gateway recognizes whether the call is fax or data, the connection will be established automatically. When the tone is not sent or some problems with recognition occurred, it is necessary to dial before destination number code ***01*** for fax call or ***02*** for data call. This code is used to inform the Gateway, that the call is a fax or data call.

Receiving a fax message from GSM

It is recommended to activate separate fax number on your SIM card – **multinumbering scheme**. Fax messages must be routed to fax number, data call to data number. Incoming fax, data and voice calls will be then automatically recognized. It is possible to set ring pattern for fax and data call, different from the pattern for voice call.

If the fax or data number is not activated, the call from analogue network routed to your GSM number is not detected as fax or data call and is routed via the

analogue channel of GSM network and the connection is not successful. In this case it is possible to set the gateway using DTMF commands using device connected to FXS line. This commands can be used for data and fax routing to FXS line or serial line.

DTMF codes for fax receive:

- ***9900#** Reset of all following settings for fax receive
- ***9901#** The next call is fax, suspended after receiving call or *9900#
- ***9902#** Fax routed to FXS, inactivate *9900# or device reset +
- ***9903#** Fax routed to COM, inactivate *9900# or device reset +

DTMF codes for data receive:

- ***9800#** Reset of all following settings for data receive
- ***9801#** The next call are data, suspended after receiving call or *9800#
- ***9802#** Data routed to FXS, inactivate *9800# or device reset +
- ***9803#** Data routed to COM, inactivate *9800# or device reset +

Commands marked + are used to set parameters, which can be set permanently in configuration program (PCManager). Using DTMF commands has higher priority, than setting in configuration program, but is valid only till reset of gateway or inactivating command.

Setting for the next call is only alternative solution, which is not able to substitute using of multinumnerig scheme (e.g. when unexpected voice call is incoming before the fax or data call, this solution disables to receive it).

Supported fax and data protocols

Supported fax protocols

The gateway supports connection of analogue Fax Group 3 using protocols V.29, V.27 and V.27ter. Maximal data rate is 9,6kbps. The maximal data rate is strongly dependent on line quality, which is tested on the beginning of connection, to avoid data errors.

Supported data protocols

The gateway supports connection of analogue modem using protocols V.34, V.32bis, V.32, V.22bis, V.22, Bell 212A and Bell 103. Maximal data rate is 56kbps. For connection between two modems is the data rate limited by the CSD data rate in GSM network, the maximum is 14,4kbps.

Higher data speed could be useful only for GPRS connection. The maximal data rate is strongly dependent on line quality, which is tested on the beginning of

connection, to avoid data errors. The data rate for GPRS connection is limited by actual speed of GPRS transfer in GSM network too. This speed is often affected by network load.

4.3 SMS Sending Input

This universal input is intended especially for reporting alarm or error statuses of any equipment provided with the appropriate contact (a relay contact, e.g.).

By activating this input (electric input pin interconnection) you send one SMS to one pre-programmed telephone number.



Caution

- Do not use in life-supporting or property-protection applications because of the character of SMS service and 2N® SmartGate equipment. The manufacturer shall not be liable for health and property damage incurred as a result of SMS sending failure.

4.4 COM – Serial Interface

The complete serial interface RS-232C on a 9-pin connector is identical with any external modem.

The transmission rate ranges from 1200 to 115200 bps (2N® SmartGate supports autobauding, i.e. responds to an AT command at a rate identical with the AT command transmission rate, and retains set on this rate). The transmission setup must be 8 bits, no parity and one STOP bit (8N1).

SmartGate's central processor uses the same interface for establishing calls and so it must have the possibility to block an external serial interface - all PC SW must provide transmission hardware flow control (HW handshaking).

COM can be used for

- Programming and monitoring;
- CSD PC-PC data transmission;
- CSD or high-speed GPRS connection to the Internet;
- SMS sending and receiving.

Programming, Monitoring

Install the 2N® SmartGate PCManager software available on the included CD-ROM into your PC.

The program is designed for 2N® SmartGate parameters programming. It can read configuration data from the memory and store them in SmartGate. Moreover, all parameters can be saved in your PC file for backup or saving into another 2N® SmartGate system.

The 2N® SmartGate PCManager contains an easy monitoring tool too. With this tool you can identify the GSM provider's name, signal strength, GSM module, SIM card, and so on during 2N® SmartGate operation.

CSD PC-PC Data Transmission

The CSD mode provides data transmission in the GSM network at the maximum transmission rate of 14400 bps. It works like a classic connection of two modems (AT commands ATD, ATH, ATA, etc.). Connection can be made with another GSM modem or a PSTN modem.



Caution

- Data calls and fax calls from the PSTN come as voice calls (the telephone line on 2N® SmartGate rings) because an analog network is unable to distinguish a modem/fax call. Therefore, it is necessary to have a special telephone number for incoming data and fax calls on the SIM card different from voice call numbers (Multi-numbering scheme). The GSM network identifies a call incoming to this number as a data/fax call and lets the COM serial interface ring. For gateways with Fax option (analog fax and data connection) see section 6 - Fax and Data function.

CSD or High-Speed GPRS Data Connection to Internet

To connect to the Internet, install the faxmodem driver from the 2N® SmartGate CD-ROM first. Another possibility is to use the GSM provider's installation wizard in case it supports the SIEMENS GSM module installed in 2N® SmartGate (SIEMENS, MC55/56 or MC55i). GPRS/faxmodem driver can be found on installation CD. The path to the driver is \\data\\SmartGate\\Modem driver\\. Driver's filename is mdm2n_vx.x.inf where x.x stands for the version of the driver.

The installation wizard usually configures the telephone connection of the network too. If you use manual installation, you have set it properly. Ask your GSM provider for Internet connection instructions because they can be different for each provider (especially the telephone number to be dialed, DNS, etc.). For GPRS connection is necessary to set the APN. It could be set in gateway using PCManager (GSM&SIM - GPRS APN) or in modem extra settings in PC:

Example: at+cgdcont=1,"IP","internet.t-mobile.cz"



Caution

- GSM providers mostly specify the ***99#** number to be dialed for GPRS connection in their instructions. SIEMENS GSM modules require the ***99***1#** format.

CSD or GPRS Data Connection?

The maximum CSD transmission rate is 14400 bps. GSM connection is reserved for the whole time of connection and calls are charged according to the connection time. The CSD mode can provide data connection of two PCs.

2N® SmartGate is equipped with GSM modules providing GPRS class 10 (4+2 timeslots), which means that it is able to transmit data into a PC at the rate of 85600 bps and at half the rate towards the GSM network. The GPRS cannot be used for connection of two PCs. It can only provide connection with an APN – e.g. the Internet. Most GSM providers charge GPRS connections according to the volume of data transmitted or by a lump sum and so the GPRS is suitable for long-time connection with occasional data transmissions.

SMS Sending and Receiving

It is possible to send and receive SMS units using appropriate AT commands. There are a number of PC programs that are based on this principle. Install SW designed for SIEMENS GSM modules (SIEMENS mobile telephone SW can also be used). You can send and receive SMS even during 2N® SmartGate voice calls.

Combination of COM Traffic with Voice Calls

As already mentioned, SMS transmission can be made even during telephone calls. The SMS program is only blocked temporarily during outgoing call to GSM establishing and incoming call from GSM ringing.

The same applies to PCManager monitoring. A message announcing that 2N® SmartGate is blocked is displayed during voice call establishing.

No voice call to GSM can be made during CSD data transmission.

Outgoing and incoming calls even to GSM can be made during GPRS connection. The GPRS connection remains active during the whole call to GSM but no data can be transmitted (2N® SmartGate is a GPRS terminal of class B). Once the call is terminated, data transmission is recovered immediately.

List of Supported AT Commands

There are original files related to SIEMENS GSM modules in the PDF format on the 2N® SmartGate CD-ROM.

Caution!

- Since the GSM module is primarily used by the 2N® SmartGate central processor for voice calls, use AT commands carefully. You might configure the GSM module wrong thus making 2N® SmartGate inoperative. To solve most of these problems, switch 2N® SmartGate off and on again to make the central processor execute full initialization of the GSM module.

Do not use particularly:

ATQ1	AT+CMUT=	AT^SNFI=
ATS3=	AT+CMUX=	AT^SNFM=
ATS4=	AT+CSCS=	AT^SNFO=
ATS5=	AT^SAIC=	AT^SNFPT=
ATV0	AT^SM20=	AT^SNFS=
AT&C0	AT^SMSO=	AT^SNFV=
AT+IPR=	AT^SNFA=	AT^SNFW=
AT+CFUN=	AT^SNFD=	

4.5 SIM Card PIN protection

If a SIM card is PIN-protected and the PIN is not programmed in SmartGate, GSM LED indicates the state and the PIN tone is transmitted on telephone line.

PIN Entering by PCManager

Like other parameters, the PIN code can be entered using a PC programming tool. The PIN will be entered automatically upon every 2N® SmartGate power up.

PIN Entering via Telephone Line

PIN entering via a telephone line connected to FXS interface:

1. Hook off the phone, you can hear the PIN tone.
2. Enter the PIN using the DTMF. You can cancel the wrong PIN by entering of a , or you can hang up before sending a .
3. To confirm enter a .
4. If you hear the busy tone in a while (a few seconds), you have entered the PIN correctly. Hang up and wait for registering to the GSM network.
5. If you hear the PIN tone again in a while, you have entered a wrong PIN. Re-enter the PIN correctly.
6. If you hear the PUK tone in a while, you have entered a wrong PIN and the SIM card is blocked. Use the mobile phone to unblock the SIM card.

PIN entering via a telephone line connected to FXO interface if 2N® SmartGate is used as gateway for extension line of PBX:

1. Dial the SmartGate's extension number on your PBX. 2N® SmartGate detects ringing and after off hook generates the PIN tone.
2. Enter the PIN using the DTMF. You can cancel the wrong PIN by entering of a , or you can hang up before sending a .
3. To confirm enter a .
4. If 2N® SmartGate after a while (a few seconds) hangs up, you have entered the PIN correctly.
5. If you hear the PIN tone again in a while, you have entered a wrong PIN. Re-enter the PIN correctly.
6. If you hear the PUK tone in a while, you have entered a wrong PIN and the SIM card is blocked. Use the mobile phone to unblock the SIM card.

A correctly entered PIN is stored in SmartGate's memory as if you had programmed it using the PCManager. The PIN will be entered automatically upon every 2N® SmartGate power up.

Automatic PIN Entering

You need not enter the PIN upon power up if it is stored in 2N® SmartGate – it is entered automatically. This function is useful in case of power failure; 2N® SmartGate is operable in a short time after power recovery without any intervention by the operating staff.



Caution!

- One PIN entering option is exhausted by the attempt to enter the PIN automatically upon SIM card or PIN change. If wrong, the automatically entered PIN is cleared from the internal memory to avoid another false attempt upon next power on. There are still two manual PIN-entering attempts after such unsuccessful automatic entering. To prevent the unsuccessful automatic PIN entering, delete or program properly the 2N® SmartGate PIN using the PCManager in the case of SIM card change.

4.6 Free minutes option

Basic description

With Firmware 1.5x and 3.5x only!

Free minutes option allows user to control amount of minutes used for four groups of operators in one month period. The user then knows, if performed calls are included in free minutes bundle, or if he has to pay extra price for it. Calls for extra price can be disabled. All setting done by customer is accessible by DTMF setting.

Setting of prefixes (operators) in four banks can be changed using PCManager. This setting, the amount of free minutes in every bank and rules for time counting are preset from factory.

Programming of parameters is done the same way like programming of all other gateway parameters. To change free minutes option parameters, you can either:

- Use the DTMF programming on a telephone line. There are parameters, which can be programmed using telephone line based programming with password access as described in part 3.1 and commands with direct access, used the same way as command for configuration of network services as described in part 4.1.
- Use a PC with the PCManager installed.

Parameters – password access

Call with empty bank permitted	Function No.: 310
---------------------------------------	--------------------------

The call with empty Bank is either disabled or permitted. When the bank is empty, you hear after dial refusing tone. With call disabled is followed by Busy tone and the call can't be established. With call permitted you can hang up the call, otherwise the call is established and charged.

Setting options: 0/1 (disabled / permitted)

Default setting: 0

Date for automatic refill	Function No.: 311
----------------------------------	--------------------------

The day in month, when all four banks of free minutes will be refilled with predefined values. The refilling is done in time 00:00:01 of selected day. When the date for refill doesn't exist (31.2.), the refill is done first day after this date (1.3.).

Setting options: 0-31 (0 – function off)

Default setting: 0

Next automatic refill – information field
--

Minutes available till the end of billing period.

Free minutes**Function No.: 32x**

The number of minutes that will be used to refill banks. The selection x is 1 to 4, according to bank number.

Setting options: 0-65535

Default setting: 0

Initial time**Function No.: 33x**

Initial time interval in seconds, which is charged for every call, although the call is shorter. The selection x is 1 to 4, according to bank number.

Setting options: 0-255

Default setting: 0

Time step**Function No.: 34x**

The minimal time interval to be counted (for example 60 seconds means, that after initial call time every beginning minute will be counted). The selection x is 1 to 4, according to bank number.

Setting options: 0-255

Default setting: 0

Remaining minutes – information field

Minutes available till the end of billing period

Commands – direct access

Setting of the date and time

The time and date is set according to information from GSM network, if this service is in network supported. When the service is not accessible, the user has to set the time when the gateway is first used or switched off for longer time period (there is backup for clock, which supports correct clock for approximately 10 hours without power).

When the time is to be set, the user is informed about this fact by additional short tone before dial tone. The LED network after connecting to network shines discontinuously (short breaks in shining).

Code for setting: ***06*YYMMDDhhmm#**

Where:

YY: year

MM: month

DD: day in month
 hh: hour
 mm: minute

When the date is valid, the confirmation - OK is generated 🎵
 otherwise there is there confirmation - bad. 🎵🎵🎵

Refill now

The command is intended for refilling of free minutes banks with predefined values (free minutes) manually just now. This command is to be used for initialization or for manual handling of system.

Code for setting: ***07#**

The confirmation - OK is generated 🎵

Setting of free minutes option - PCManager

All parameters, which can be set up by DTMF can be set up by PCManager too. There is page in PCManager – Call table – Free minutes bank for this setting.

Free minutes bank – PCManager only

In Call table – FXS routing table is added column “Free minutes bank”.

Called numbers can be associated to one of four groups (bank). All calls to numbers in the same bank are handled the same way according to free minutes counting rules specific for bank. This table is usually preset by supplier.

Setting options: 0-4 (0 – no bank selected, free minutes inactive)

Default setting: 0

Time setting

In Monitor you can check the actual time on PC and on Gateway

There are two commands for time setting in Monitor:

Synchronize to PC: The time in gateway is set according to actual time on PC

Manual setting: Setting date and time manually

Using Free minutes option – step by step

1. If your gateway is preset by supplier to be used with some billing scheme, you can continue with step 6
2. Collect all information about billing scheme you use from your operator.
3. You have to set parameters by PCManager. Connect the gateway to your PC by serial cable and to power by adapter. When the gateway is connected to network, you can set it by PCManager.
4. Set the table "FXS routing table". Prefixes for different operators and Free minutes bank should be used to divide calls to groups. The maximal amount of groups – banks is 4. The maximal number of prefixes is 20 (number of lines in table).
5. Set the table "Free minutes bank". You have to decide, if call with empty bank will be permitted. Than fill the day, when the billing period starts. Finally fill the table with rules for free minutes bank according to your operator billing.
6. Set local prefix for fixed line, dependent on place where the gateway is used.
7. Set the actual time, either by PCManager – monitor or by DTMF direct access. When the time information is provided by network, this step is not required.
8. If you have actually full amount of free minutes, you can use command "Refill now".
9. The gateway is now registering your calls and counting free minutes from operator.
10. When the gateway is switched off for more than 5 hours and the time information is not provided by network, you have to check, if the time is set (see setting of the date and time).
11. Information about state of used free minutes is saved in memory independent on power. This information is actualized after every call.



Warning

- The free minutes counting is intended to give information to user about the state of his free minutes account. For billing is the registration done by operator valid. When the difference between operator evidence and free minutes counting occur, the billing is done according operator accounting.

5

Technical parameters

This section describes the technical parameters of the product **2N® SmartGate**.

5.1 Technical Parameters

GSM

GSM module, GSM bandwidth	MC55i: EGSM 900/850MHz, GSM 1800/1900MHz
Transmission power	2 W EGSM 850/900 MHz, 1W GSM 1800/1900 MHz
Receiver sensitivity	-104 dBm
Audio	HR+FR+EFR Half rate+Full rate+Enhanced full rate Echo cancellation, Echo suppression
DATA	GPRS Class 10, 4+2 max. 85.6 kbps downlink CSD max. 14.4 kbps; Coding scheme CS 1, 2, 3, 4
Analog Fax and Data models with FAX converter	Fax Group 3, up to 9,6kbps Data up to 56kbps (Limitation of GSM network - see 6.3)
Antenna	850/900/1800/1900 MHz 50 Ω SMA antenna connector
SIM card	3/1,8V plug-in

Power Supply

Mains supply	230/12V; 0,5A adapter
DC power supply	10 to 16 V DC (accumulator 12V)
12V consumption	Standby 100 mA Call/data typ. 300 mA, max. 400 mA
Supply connector	DC Jack 5,5/2,1 mm

Telephone Interface FXS (for PBX external line or phone set)

Interface type	2-wire analog, FXS
----------------	--------------------

Telephone connector type	RJ 12, 6/2
Line impedance	600 Ω
Loop voltage on hook	48 V DC
Loop current	max. 40 mA
Loop resistance	max. 800 Ω
Tone frequency	adjustable, default 425 Hz
Dialing type	tone (DTMF) or pulse
Ringing voltage	42 Vrms 50/25 Hz
Calling line identification	CLI during ringing according to ETSI FSK
Tariff pulses	f=16/12 kHz ; Umin=100 mVef on 200 Ω
Answer supervision	polarity reversal, 12/16 kHz pulses

Telephone Interface FXO (for PBX extension line)

Interface type	2-wire analog, FXO
Telephone connector type	RJ 12, 6/2
Line impedance	Zr (TBR21) or 600 Ω (According to model of Gateway)
On-hook DC resistance	1 M Ω
Off-hook line current	10 - 65 mA
Off-hook line voltage (typ.)	4,5 V for 25 mA
Dial tone frequency	adjustable, default 425 Hz
Dialing type	tone (DTMF)
Ringing voltage	Min. 20 Vrms 25-50 Hz
Ringing impedance	4 - 10 k Ω / 50 Hz

Dial thru parameters

Voltage drop (typ.)	1,7V / 25 mA
Closed loop resistance (typ.)	6 Ω

SMS Sending Input

Closed loop resistance	max. 1 kΩ
Open loop resistance	Min. 25 kΩ
Input overvoltage protection	max. +/- 12 V

Data Interface

Interface type	RS-232C
Connector	D-Sub 9 pins
Interface transmission rate	1200 - 115200 bps (autobauding) 8N1

Others

Dimensions (w/o connectors)	170 x 130 x 45 mm
Operating temperature	0°C to 45°C
Operating status signaling	3 LEDs (on, GSM network, line)

6

Supplementary Information

This section describes supplementary information of the product.

Here is what you can find in this section:

- Regulations and directives
- Troubleshooting
- List of Abbreviations
- General Instructions and Cautions.

6.1 Regulations and directives

2N® SmartGate 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 European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC
- Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste 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 2002/95/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

6.2 Troubleshooting



For tips for the solution of other potential problems see faq.2n.cz.



No LED is on after power up

- ◆ Check the power supply.



All LEDs are on. No call is currently in progress.

- ◆ 2N® SmartGate is in the special PCManager-based programming mode - exit the PCManager to reset SmartGate
- ◆ Try to switch 2N® SmartGate off and on, the LEDs should go off in 3s and signal the status of SmartGate



2N® SmartGate does not register to GSM

- ◆ Check the SIM card.
- ◆ Check the PIN.
- ◆ Check the antenna connection.
- ◆ Select a place with a good GSM signal.



No tone can be heard after line off-hook

- ◆ Check the telephone line connection.
- ◆ 2N® SmartGate is not initialized properly upon start (approx. 10s after power up).
- ◆ 2N® SmartGate is not supplied with power.



2N® SmartGate keeps transmitting a tone during dialing, not receiving the dialing

- ◆ Select the correct dialing type (DTMF or pulse).



Voice disturbance on telephone lines during GSM call

- ◆ Check signal strength using PCManager monitor. Place 2N® SmartGate to place with good GSM signal.
- ◆ Check distance between telephone lines and SmartGate's antenna. Distance between antenna and other telecommunication systems should be as long as possible.
- ◆ If there are still problems, use the antenna with coax cable.

- ◇ ? *2N® SmartGate does not communicate with PC*
- ◆ Check the serial cable connection.
 - ◆ Check the COM number setting on PC.
 - ◆ Check the COM parameters (1200-115200 bps, 8N1).
 - ◆ 2N® SmartGate is not registered to GSM network.
 - ◆ A dialing or outgoing call establishing process takes place on SmartGate.
 - ◆ An incoming call is ringing on SmartGate.

6.3 List of Abbreviations

- **APN** (Access Point Name)
Necessary for the GPRS service.
- **CLIP** (Calling Line Identification Presentation)
- **CSD** (Circuit Switched Data)
- **COM**
A PC Serial port.
- **DTMF** (Dual Tone MultiFrequency)
Tone dialling.
- **FSK** (Frequency Shift Keying)
A transmission protocol using variable signal frequencies for logic level encoding.
- **FXO**
An interface electrically identical with a standard telephone (opposite side = FXS interface).
- **FXS**
A telephone interface allowing a standard telephone connection (opposite side = FXO interface).
- **FW** (Firmware)
Similar to SW, a term for the central microprocessor program.
- **GSM** (Group Switched Mobile system)
The present-day standard digital mobile telephone network.
- **GPRS** (General Packet Radio Service)
High-speed data transmission for GSM networks.
- **HW** (Hardware)
An electronic device, circuit, board, component, etc. in this context.
- **P(A)BX** (Private (Automatic) Branch Exchange)
- **PC** (Personal Computer)
A personal computer based on the IBM PC standard.
- **PIN** (Personal Identification Number)
A SIM card securing password.
- **PUK** (Personal Unblocking Key)
A password used for releasing a blocked SIM card after repeated wrong PIN entering.
- **RS-232C**
A PC serial port standard.
- **SIM** (Subscriber Identity Module)
A chip-equipped module to be inserted in a GSM device for identification.
- **SmG**
2N® SmartGate
- **SMS** (Short Message Service)
A term for the system and one unit (message).

- **SW**
Software.
- **TTL** (Transistor-Transistor Logic)
A standard digital technology defining voltage for levels 0 and 1.
- **PSTN**
Public Switched Telephone Network.

6.4 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 therefrom 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 short-circuited either.



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