Link Gate A FXO

Manual V1.0

Index

1. Basic features:

Link Gate A FXO A is dual band GSM Gateway based on the Siemens GSM module TC35i (eventually MC55) equipped with a lot of adjustable features increasing service quality. It has been designed for both 900 MHz and 1800 MHz GSM networks.

- Installing the LinkGate A FXO to your PSTN line will reduce your phone bills – GSM calls are routed to GSM network and land line calls are routed to PSTN line.
- Polarity swap of telephone line allows exact detection of start and end of call.
- CLIP support all ordinary protocols
- CLIP is very important for using other services (CallBack, Mobility Extension etc.);
- When Identification of PSTN line fails, it allows to switch automatically to GSM line (back up);
- Call billing allows exact control of call duration due tax pulses 12/16 kHz (1 pulse when outgoing call is picked up).
- Each minute during your call, a beep will allow identifying a GSM call.
- Integrated USB port allows you to easily set it up with PC software as well as sending and receiving SMS messages (via SMS mail sw)* or data transmission.

Thanks to the Link Gate A FXO features you can satisfy a wide group of customers. Adding allowed numbers to the Link Gate A FXO memory, you can restrict unwanted calls (public numbers). You can also program the Link Gate A FXO to provide incoming calls only. The CallBack and Mobility Extension are other features which either provide your permanent availability (Mobility extension) or reduce your phone costs when you are abroad (outgoing, incoming roaming savings).

2. Possibilities of unit installations

### 2.1. basic connection – All calls are terminated over GSM
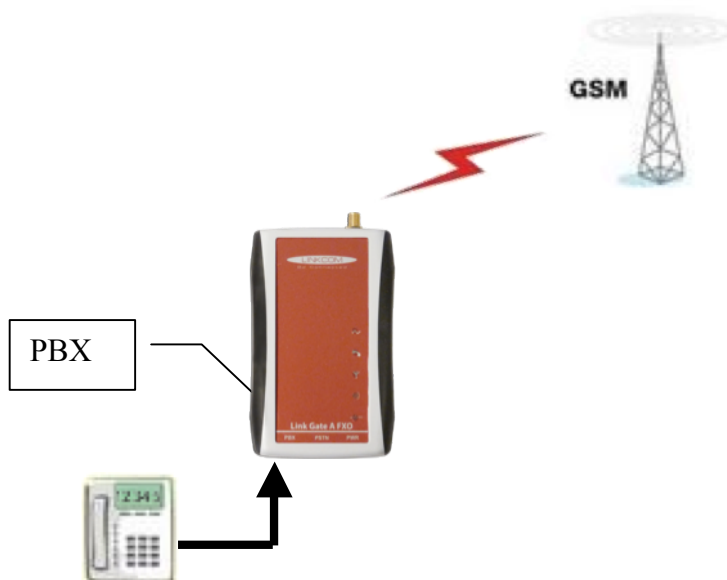
- The unit simulates an ordinary PSTN line with CLIP and call billing. When call is established or ended it switches line polarity.
- Call barring by programming up to 9 permitted 1 to 4 digits prefixes. All remaining prefixes are prohibited (busy tone).
- After setting "wait for dial to CallBack" on a PSTN line, when dial 0 during call back you will transfer the call immediately to connected analog phone or PBX (see description of CallBack feature).
- The Mobility Extension feature works the same way like an ordinary GSM mobile phone – call forwarding when you don't accept the call. When Phone or PBX connected to the unit is ringing, after certain time (3 rings) the call is automatically forwarded to preprogrammed GSM mobile number.

## 2.2. Installation between PBX(phone) and PSTN line.

Land line calls are terminated via PSTN line and GSM calls via GSM network. All incoming calls are routing to connected PBX (analog phone).
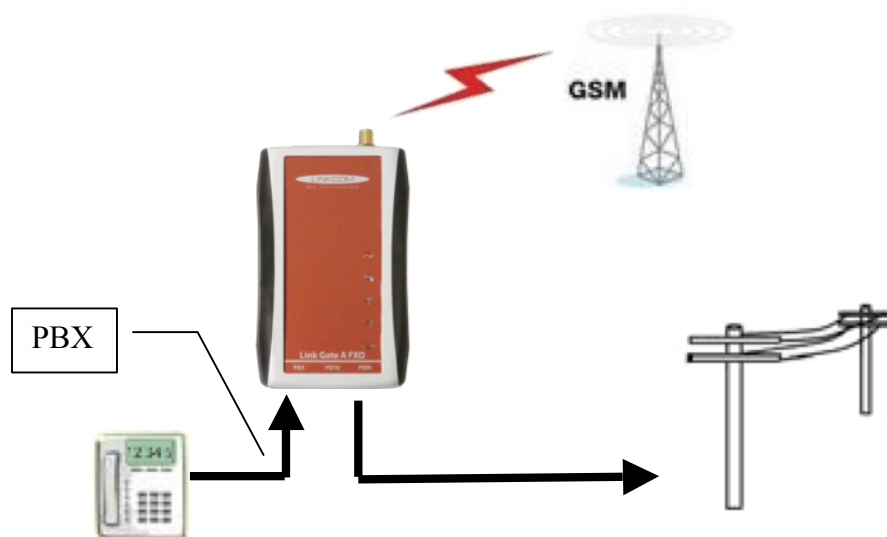
- In basic setting all outgoing calls are routed to PSTN line . In case of PSTN line disconnection or failure all calls are automaticaly forwarded to GSM (Back up – security).

- When you pre-program directions to GSM (9 memories of 1to 4 digits prefixes) then allowed directions are routed via GSM, the remaining via PSTN line (when is connected).

- When you activate "wait for dial to CallBack" into PSTN line, it can be use during callback, either dialing into connected PBX (phone) or getting access to PSTN line (eventually used speed dial for PSTN line).

- The Mobility Extension is intended to transfer calls from PSTN line to GSM (mobile phone). When forwarded call from PSTN line to your mobile is rejected you can activate the SMS feature which informs you about the missed call by SMS.

2.3. Mobility Extension
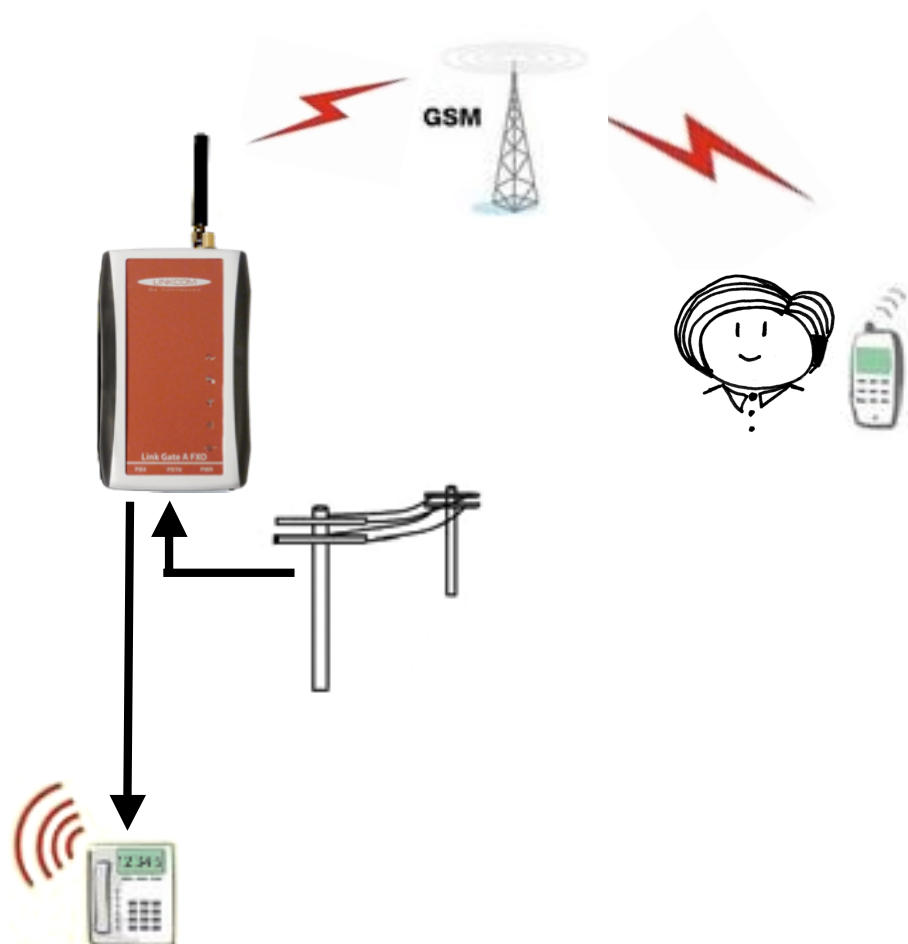
Using the Mobility Extension feature allows you to do not miss any incoming calls even if you are out of office. When an incoming call from PSTN line connected to a PBX (phone) starts ringing and is not picked up (3 rings), the unit dial automatically a pre-programmed number (for example: your mobile phone). Your mobile phone will ring then simultaneously with PBX (phone), (behavior is like parallel line), and whoever picks up first will get the call; When you reject the call on your mobile phone the unit will send you an SMS with the number of missed call (when it has a CLIP).

When an incoming call to a GSM unit, the call is processed as call forwarding during unavailability of your mobile phone, Connected PBX (phone) starts ringing, After 3 rings the call is automatically forwarded to a pre-programmed GSM number.

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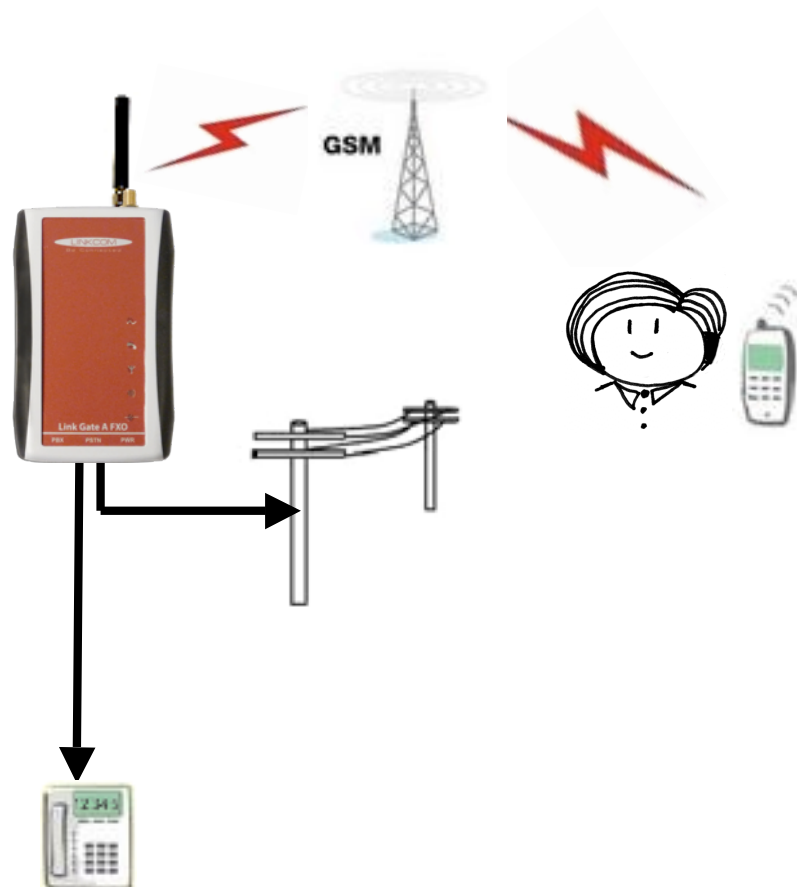
2.4. CallBack

Callback feature allows you to make a phone call charged to GSM unit account when you are abroad.

- GSM mobile numbers using this service are saved (phone book) on the SIM card of the unit.

- You make a call to the unit

- When unit identifies (CLIP) the calling number on the saved list, it rejects the call and activates the callback feature.
- When you pick up this call you will hear a "CallBack" tone (see List of tones). You have then following options:

Dial *0 – get access to PSTN line, *1 to *4 – speed dial memories, any other – PBX (phone) or you can wait for pre-programmed time to be automatically connected to PBX (phone).
This Callback feature allows you to reduce rapidly your phone costs when you are abroad and make a phone call charged to unit's bill.

3. Installation

antenna

Yellow button

Power supply

Phone or trunk line from PBX

PSTN line or extension of PBX

Link Gate A FXO

PBX   PSTN   PWR
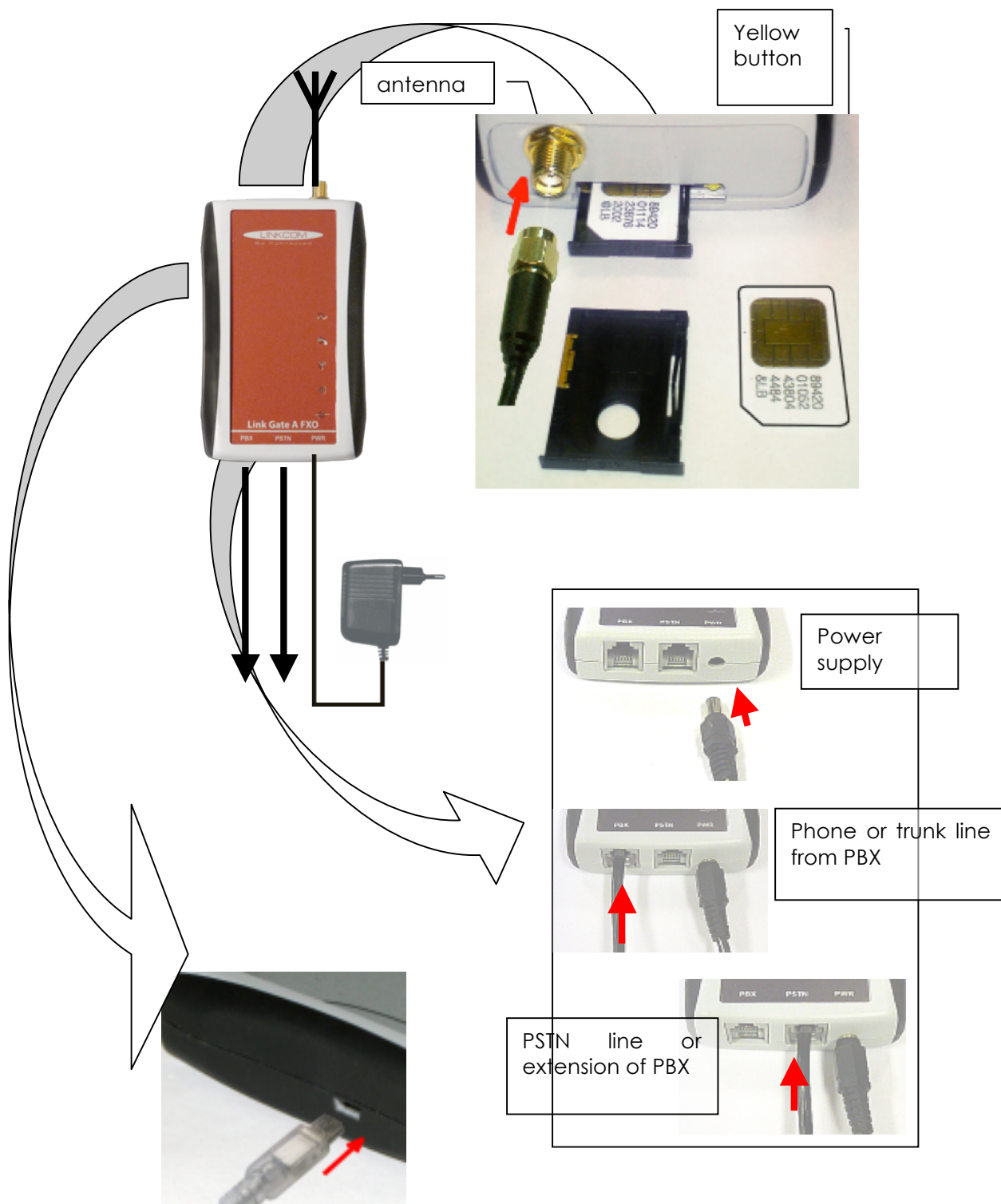
By pressing the yellow button release the SIM card holder. Insert the SIM card and release the SIM card holder. Before inserting the SIM card we recommend checking different mobile phone SIM cards settings (logging with or without PIN, etc.) and set logging without PIN. When you want logging with PIN you have to pre-programmed this PIN and set logging with PIN (see table of programming). Without this setting the Gate wont work.

DO NOT FORGET ANTENNA CONNECTION!

To select the place of installation, please take into account the following aspects:

1. distance from PBX – possibility of GSM interferences with other PBX lines as well as length of line from Gate to PBX (max. 200m)
2. main 230 V for power supply of Gate

Quality of GSM signal depends on the installation place of GSM Gate Antenna

3.1. Quality of GSM signal

The sound quality depends on the BTS, setting where you are connected to the Gate. To find the best place to mount the antenna you can use either mobile or LED flashing on the unit eventually setting SW in your PC connected via USB port. (See Manual to set software). The suitable signal power is a 3 scale mobile graduation.

To check and find best position from GSM signal point of view you can use also GG SET (configuration SW).

3.2. Connection of antenna

When you connect magnetic antenna, mount it on a big iron subject. This subject makes "counterweight", affecting the power of the radiated signal.

3.3. Start

1. Insert SIM card
2. Make sure the cables are correctly connected:
    a. phone or trunk line from PBX to the unit
    b. PSTN line or PBX extension to the unit
3. Connect device to power supply 220V
    a. The blue LED « power supply » lights up within 10 seconds
    b. After couple of seconds, a yellow LED will irregularly blink: The Gateway is connected to GSM network
    c. The CPU awaits communication with the GSM module (see LED table)
    d. After 45 seconds the yellow LED starts flashing depending on the GSM reception signal. (see LED table)
    e. When the green LED (PBX) turns off, the Link Gate A FXO is ready for operation.
4. When connected analogue phone is picked up, the green LED must turn on and a dial tone will be heard, the system is ready to use

3.4. The most often problems during Blue Gate compact installation:

- None of the LEDs are working. Problem with power supply. Check connection to main 220V as well as connection of adapter to Link Gate A FXO.

- The LED "power supply" lights. When pick up the earpiece, a green LED turns on and you get a busy tone, A Yellow LED starts flashing regularly "GSM module doesn't communicate with CPU". Check that the Link GATE a FXO is not connected to the PC and GGset on USB.

- The yellow LED flashes regularly "PIN unreadable". After calling to Link Gate A FXO you get busy tone. The SIM card requires PIN, which is not preprogrammed or has been preprogrammed wrongly.

- The yellow LED blinks every two. When pick up you hear a busy tone. Link Gate A FXO is not log into GSM network – bad signal.

- "The yellow LED flashes depending on GSM signal strength". When pick up the green LED doesn't turn on and there is no tone, Analogue line is interrupted or there is a big resistance in current loop (for example: cable is too long between PBX and Link Gate A FXO).

- 'The yellow LED flashes depending on GSM signal strength and the green Led is on' The PBX hold the line open. By calling the gateway you can remove this issue. In other cases check PBX manual.

- The Link Gate A FXO works but calls are disturbed by interference. Incorrect position of antenna to telephone line. Change antenna position.

Note : Default you make by parameter 99 in programming mode (see programming table at page 15).
All LEDs flashing as well as tone types are mentioned in tables at the end of this manual.

3.5. USB

The Gate is equipped with a USB port for direct control of GSM module Siemens TC35i (or MC35 or MC39 for GPRS) via virtual COM port. You will be able to use ordinary GSM modem for data transmission, internet connection or for SMS messages.

When unit is working as GSM modem then is busy for voice connection. When you pick up the line you will hear busy tone. The unit is monitoring data transmission by modem. The data transmission can not be permanent therefore the unit stays in data mode 10 seconds after finishing data transmission. Then it goes back to Voice mode (calling).

The same is when you are calling over unit. It is busy for data transmission.

An optional SW allows the unit for sending and receiving SMS messages is SMS mail. It is working under Outlook, Outlook Expres, Opera etc. And you can work with SMS as with normal e mails. (see manual for SMS mail). It works in batches and allows programming communication interval (1 to 99 minutes) to Link Gate A FXO for sending and receiving SMS. Due this we avoid situation that unit is permanently blocked by data mode for voice communication.

Further functionality of USB is monitoring Link Gate A FXO operation. It is also possible to record incoming calls including time and CLIP, signal strength, etc..

CAUTION : USB is galvanically connected with PSTN and PBX. When you use PSTN and USB then is necessary to use galvanically isolated PC (for example. notebook and power supply in class II).

4. Configuration

It is possible to access the program mode from a phone connected to the gateway. Press the * or # keys (# by default), then enter the PIN code, you will hear the programming tone. (see table of programming)

Progress of programming:

1. Dial a 2 digit number of the programming feature.
2. dial the parameter number (1 to 4 digits).
3. Wait for a tone of confirming request (3 short tones).
4. Confirm the feature by pressing (#)
5. Wait for confirming tone.
6. Follow by programming tone again.
7. Finish programming by hanging up the phone.

Example : programming of new permitted fix numbers (02) to memory 09:

• Press # (default is #). In phone you hear a waiting tone. Dial password (default 0000).

• Waiting tone changes to programming tone, Dial 1902. Wait for tone of confirming request (3 short tones).

• Confirm the feature by dialing (#). Wait for confirming tone (one long tone). Finish programming mode by hanging up the phone.

Warning: _After dialing the parameter number you have to wait for 3 short tones and then dial # . Wait for long tone that confirms the operation._

4.1. Notes to each parameters :

11 – 19 when you program some prefixes the Link Gate A FXO allows outgoing calls starting by those prefixes only. The others will get busy tone. When memories will be empty the calling won't be restricted (default). Memory of prefixes can content 1 to 4 digits only.

• _Rewriting of memory_ – by storing new fix-numbers, old fix-numbers are erased.
• _Erasing of memory_ - Memory you will erase by storing an empty parameter. You dial only the number of the memory which you want to erase and confirm it.

22   A very important feature is the # character setting. (Default is # but can be change to *)

24   Analogue phones are not able to send "+" which is very used in GSM. In this case is possible to use combination "00" to send it to mobile phone. Parameter 24 allows to activate or deactivate this function.

> a.   This parameter allows you to look for the best antenna position. After activation, tones will automatically start to sound, and you can scan the strength level of the GSM.

31 This feature identifies connection of Link Gate A FXO to external line. This is needed for some types of PBX (ex.: Siemens Hicom).

32,35 The GSM phones requested command to connection on inserted number. The unit will send a command immediately after pressing (#), or after timeout programmed by parameter 32. You can also

program number of digits (parameter 35). In this case you can dial shorter number. (# Character and timeout are still valid).

52   You can program phone numbers of up to 20 digits, Calls will be transfer to this number in case of no response on the analogue phone. – Mobility extension.

54   It is possible to program a phone number of up to 20 digits where are periodically (30 days by default, adjustable) sent SMS messages with unit status (IMEI, IMSI, signal strength, BTS number).

61-64   4 speed dial memories (20 digit phone numbers). They are used when CallBack feature is activated. It is useful to identify more often called numbers. They are activated by dial *1, *2, *3, *4

77   Blocking of SMS sending to number preprogrammed in parameter 52. This SMS with phone number of calling party is send in case that phone call through mobility extension feature wasn't picked up.

78   After timeout without dialing any code to access PSTN line (*0) or speed dial (*1 to *4) the call is automatically forwarded to PBX (phone) port which starts ringing.

79   The unit detects the current on PSTN line 100ms after pick up. This feature provide automatic routing to GSM network in case of PSTN line failure. When the current starts slowly on PSTN line (less then 100ms) the detection cant work and PSTN line is evaluated as failed. When you don't want use this feature, please do not use the PSTN line detection.
 Caution : *When you use GSM only (without PSTN connection) the PSTN line detection must be activated!*

Notes:

- *Programming is only by tone dial DTMF. Don't forget set even external line at PBX.*
- *Changes are valid after hanging up only (finishing of programming mode).*
- *After entering the programming numbers, it is important to wait for the confirmation tone(3 short beeps) if numbers are entered to early the programming wont*
- *Switch to programming mode is possible even on busy tone.*

4.2. Table of programming

Dial number					Feature	Default			
0	0	n	n	n	n	Password nnnn to programming mode access	0	0	0	0
1	1	n	n	n	n	Memory x for permitted fix number (1 to 4 digits)				
1	2	n	n	n	n					
1	3	n	n	n	n					
1	4	n	n	n	n					
1	5	n	n	n	n					
1	6	n	n	n	n					
1	7	n	n	n	n					
1	8	n	n	n	n					
1	9	n	n	n	n					
2	1	n				Reversal polarity n=0 OFF n=1 ON	0			
2	2	n				Acknowledge character setting n=0 - # n=1 - *	0			
2	3	n				Type of dial tone n n=0 – permanent tone n=1 – dial tone up table of tones n=2 - dial tone of public lines operator n=3 – quiet	0			
2	4	n				Turning on combination for dialling „+„ to mobile phone n=0 – combination turn off n=1 – sending „+„ to mobile after „00„ dialling	0			
2	5	n				Signalization to the call – short tone each minute n=0 – tone is turn off n=1 – tone is turn on	0			
2	6	n				Restriction of call duration n=0 – without restriction n=1 – call duration restricted at 10 minutes	0			
2	7	n				PIN n=0 – start without PIN n=1 – start with PIN	0			
2	9	n				Callback n = 0 - OFF n = 1 – ON	0			
3	1	n	n			Ringing after inicialization nn decimal of sec. (00 to 99 it is 9,9 sec) („00„ not ringing during inicialization)	0	0		
3	2	n	n			Waiting for last number nn sec. (01 to 15) (after finishing of dial by acknowledge character is sending immediately)	0	6		
3	3	n	n			Waiting nn sec. for dial after pick up (00 to 99 it is 9.9 sec) („00„ waiting is not limited)	0	0		
3	5	n	n			Number of dialled numeral, after its is dial send immediatelly (lenght of telephone number) nn=00 – function none active nn=01-19 – number of numeral telephone number	0	0		
3	6	n	n			Ignoration of dial nn decimal of sec. After picking up nn=00-99 decimal of seconds	0	0		
3	7	n	n	n	n	Storing of PIN				
3	8	n				Amplification of sound in outgoing direction (1 to 4)	1			
3	9	n				CLIR feature, switching OFF outgoing CLIP (#31#) n=0 OFF n=1 ON	0			
5	2	n	n	n	n	Max 20 digits number for „mobility extension"				
5	3					Free				
5	4	n	n	n	n	GSM number for sending control SMS				
6	1	n	n	n	n	Max 20 digits number of 1. speed dial memory of Call back				
6	2	n	n	n	n	Max 20 digits number of 2. speed dial memory of Call back				
6	3	n	n	n	n	Max 20 digits number of 3. speed dial memory of Call back				
6	4	n	n	n	n	Max 20 digits number of 4. speed dial memory of Call back				
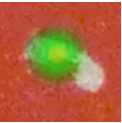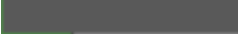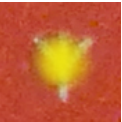
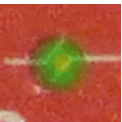| 7	1	x x	y y	Xx= 00 No charging pulses Xx= 12 12 kHz charging pulses Xx= 16 16 kHz charging pulses Yy= 00 1 pulse only at the moment of connection Yy= 01 to 99 seconds. Pulses each 01 up 99 seconds			
7	3	n		N= 0 CLIP is switch OFF N= 1 FSK CLIP Bell N= 2 FSK CLIP BT N= 3 DTMF CLIP			
7	4	n		Call progress tone n=0 – OFF n=1 – ON			
7	5	n		Roaming n=0 – prohibited n=1 – permitted			
7	6			Free			
7	7	n		Sending of SMS with CLIP of called party when you reject the call from „mobility extension" feature n = 0 – restricted n = 1 – permitted			
7	8	n		Waiting for dial to PSTN line for CallBack			
9	9			Default setting			

4.3. Tones on lines of GSM unit

	Dial tone (up setting) Mini Gate is ready to accept dial
	Busy tone – short tone repeated Called part is busy, doesnt exist, not permitted, etc..
	Ringing tone – long tone and pause repeated Called part is ringing
	Waiting tone – short tone repated with quick cadence. Mini Gate waiting for password insert
	Programming – short tone with quick cadence í Programming mode of Mini Gate
	Confirmation inquiry - 3 short tones Inquiry to confirm inserted parametr
	Confirmation tone – long tone Parametr was saved correctly.
	„CallBack" tone – 1 tone Inquiry to dial dialling in code or dial number of speed dial
	Minute tone – short tone with 1 minute period Minute beep to inform about GSM c all.
	Call progress tone – short tones with different frequency Searching of called part.

4.4. LED signalling

		Permanent light (lights up 3 sec after connection of main power) GSM modul is powered.
		Permanent light PBX port is OFF HOOK
		Do not light PBX port is ON HOOK
		Flashing in rhytm of busy tone Programming mode or PC communication
		Flashing in 2 sec. interval SIM is not readable (wrong PIN, SIM is not inserted, etc....)
		Short lights off in period 2 sec. GSM modul is not communication with unit CPU
		1- 5 light flash in period 4 sec. stand by mode, unit registrated into GSM network, number of flashes = signal strength (5 max)
		Short light flashing in period 2 sec. Unit is not registrated in GSM network
		The spped flashing with different time period GSM communication is running: GSM network registration, data communication, etc..
		Unregular flashing Voice communication on the line
		Permanent light or light is off No communication on the line
		Not lighting PSTN port is ON HOOK
		light : PSTN port is off hook

5. Technical parametres :

Type	Link Gate A FXO
Operating position	various
Operating conditions	temperature: +5° C ÷ +40° C, humidity: 10% ÷ 80% at 30° C
Dimensions (mm)	110 x 68 x 27 mm

Part of power supply

Supply voltage	230 V (±10%) (adapter)
Power input	max. 15 VA
Protection	thermal fuse in adapter
Safety group	CSN EN 60950 group 2

Analogue telephopne lines

telephone interface	2-wires
telephone conector	RJ 11
Impedance	600 Ω ± 20%
Dial	tone DTMF t_t > 30 ms
Start and end of connection	Polarity reversal
Signalization	425 Hz ±20Hz
CLIP	FSK Bell, BT,DTMF

PBX

Supply conduction	symetrical 24V
Current loop	max 38 mA
Resistance of subscribers conduction	max. 500 Ω
Ringing	55 V_{ef} / 50 Hz
Billing	12/16 kHz

PSTN

DC resistance in ON HOOk	min. 1 MΩ
Line current	10 – 65 mA
Ringing detection	min. 20Vrms 25 - 50 Hz

GSM:

mobile network	compatible for GSM 900 and GSM 1800
provider	according SIM card (3V and 1.8 V)

USB	version 1.1, virtual COM