SATEL®

COMMUNICATION MODULE
GSM LT-1S

⚠️ **WARNINGS**

For safety reasons, the module should only be installed by qualified personnel.

In order to avoid the risk of electric shock, read carefully this manual before proceeding to installation of the equipment. Any wire connections can only be made after disconnection of power supply.

Never turn on power supply of the module and SIM300C telephone without external antenna connected.

Making any construction changes or unauthorized repairs is prohibited.

| DECLARATION OF CONFORMITY		
Product: Communication module, GSM LT-1S	**Manufacturer:** SATEL spółka z o.o. ul. Schuberta 79 80-172 Gdańsk, POLAND tel. (+48 58) 320-94-00 fax. (+48 58) 320-94-01	CE
Product description: The GSM LT-1S communication module, designed to interact with the SIM300C mobile phone, makes simulation of the analog telephone line possible by using the cellular communication, and thus enabling telephone messaging about emergency situation in the facility, if the analog line is not available.		
The product is in conformity with the following EU Directives: **LVD** 73/23/EEC+93/68/EEC **EMC** 89/336/EWG + 91/263/EEC, 92/31EEC, 93/68/EEC		
The product meets the requirements of harmonized standards: LVD: PN-EN 60950:2000 EMC: EN ETS 300 386-2:1997; EN 55022:1998; EN 61000-4-2/-3/-4/-5/-6		
Gdańsk, Poland 06.12.2006	*Head of Test Laboratory:* Michał Konarski	
The latest EC declaration of conformity and product approval certificates are available for downloading on our website **www.satel.pl**		

CONTENTS

1. GSM LT-1S MODULE FEATURES

- Simulation of analog telephone line by the use of cellular connection.
- Interaction with alarm control panels and other equipment (e. g. DT-1 telephone dialer) which use the analog telephone line for transmitting voice information about alarms, or for sending text messages to paging system).
- Capability of recognizing messages sent to paging system and transmitting them in the form of SMS text messages to any cellular telephone number.
- Support of calls incoming to and outgoing from wireless (cellular) telephone networks.
- Support of impulse and tone dialing modes.
- Signaling of answering (receiving) a call initiated from the module T-1, R-1 terminals by changing the voltage polarization across those terminals (possibility of tariffication).
- Operation in conjunction with the STAM-1/STAM-2 monitoring station, which makes monitoring of the sites possible with the use of **SMS** messages.
- Functioning as an external modem for the CA-64* and INTEGRA alarm control panel (support of DLOAD64*, GUARD64*, DLOADX and GUARDX programs).
- Operation with PBX telephone exchanges as an additional subscriber's line.
- Operation based on interaction with the SIM300C three-range industrial cellular telephone, compatible with GSM 900/1800/1900MHz networks.
- Control of antenna signal level.
- RS port for:
  - programming the module from a computer by using the DLOAD10 program (version 1.00.25 or later),
  - connecting the module to the STAM-1/STAM-2 monitoring station,
  - connecting the module to the CA-64* and INTEGRA control panel as an external modem,
  - using the module as fax and modem.
- Output for signaling a failure (no possibility to get connection).
- Checking for presence of the module by CLIP test transmissions with acknowledgement of receipt.

* - function available for the CA-64 control panel with v1.04.03 program and DLOAD64 v1.04.04 and GUARD64 v1.04.03 programs (or later versions).

Figure 1. Hooking up the module to telephone line.
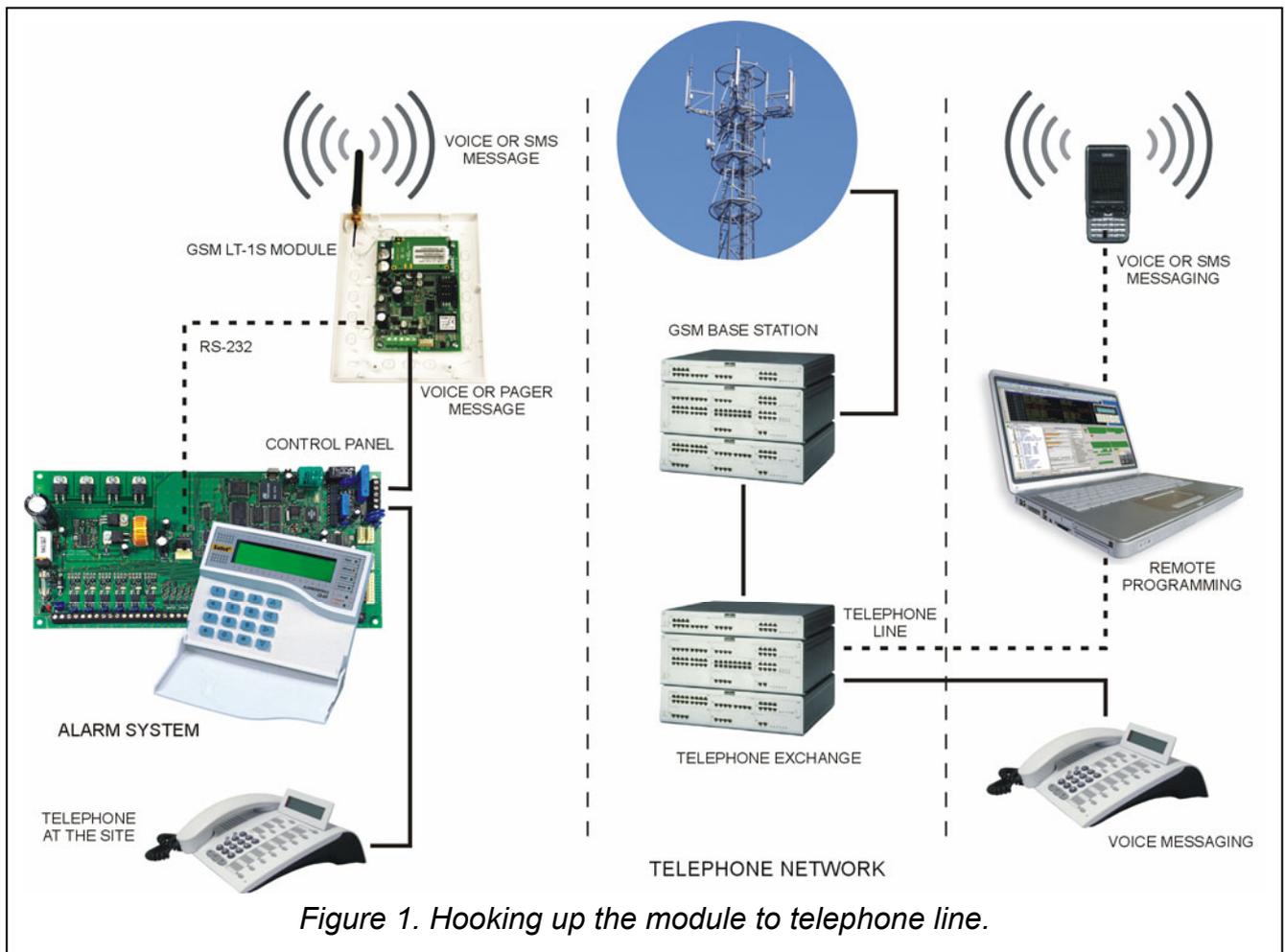
2. LIMITATIONS OF USE

As the cellular telephones are designed for the best possible transmission of voice signals, it is permissible that their data compression systems cause distortions of the transmitted audio signals. For this reason, transmission of modem signals (downloading) through a simulated telephone line may be impeded.

3. DESCRIPTION OF THE MODULE

MODULE TERMINALS:

+12V - power supply input (12V DC ±15%)
GND - ground (0V)
FLT - alarm output, SIM300C telephone failure or insufficient range (OC; 50mA)
R-1, T-1 - extension telephone line (connection to the alarm control panel or to a telephone set)

The **FLT** output is a generalized fault indicator. It gets active if connection with the base station is not confirmed by the module within 10 minutes. It may be caused by a telephone trouble, antenna failure (antenna cable damage), or loss of range due to other reasons. The fault alarm stops maximum 30 seconds after the alarm causes ceased to exist.
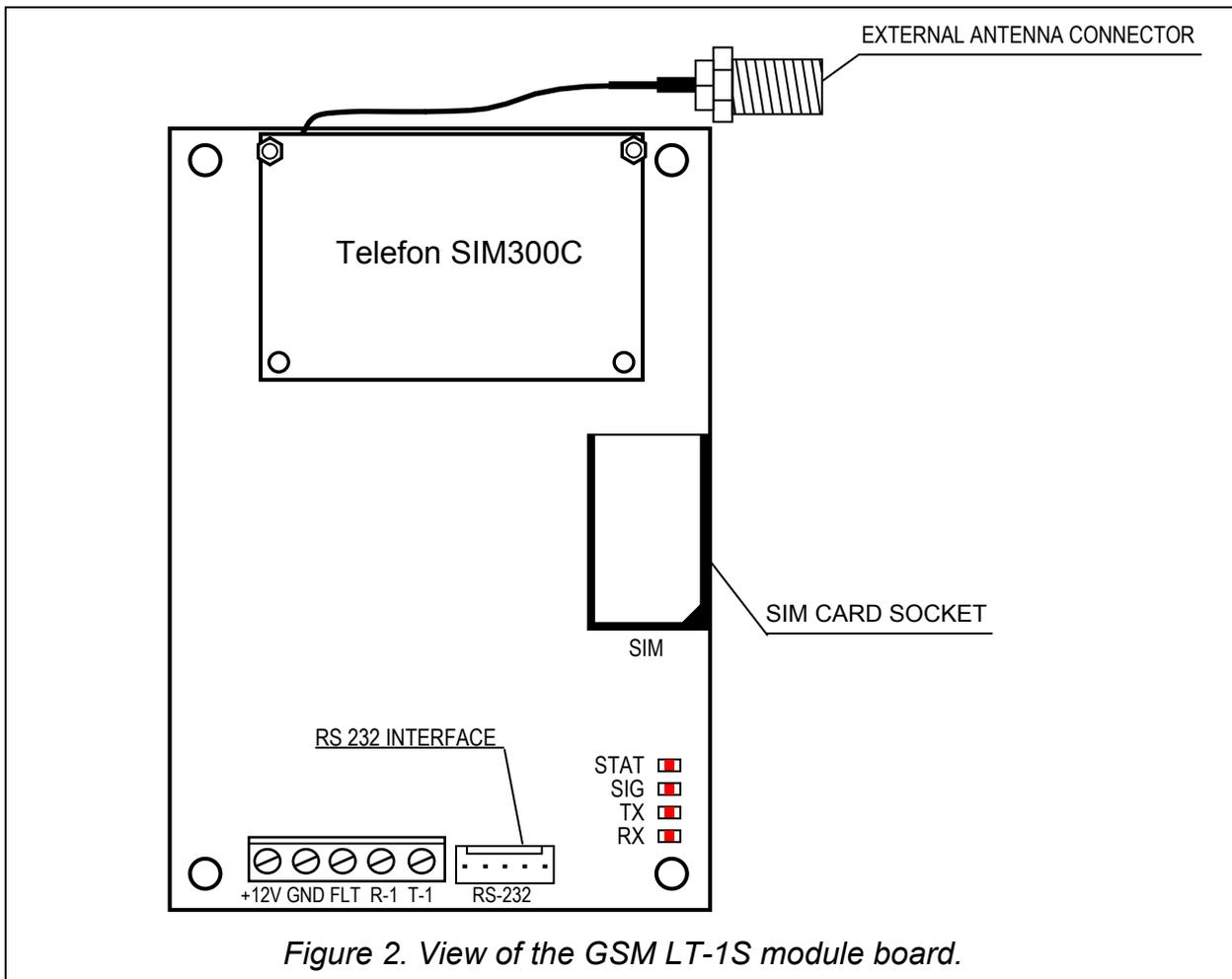
Figure 2. View of the GSM LT-1S module board.

LEDs:

The module indicates its status to the user by means of 4 LED indicators. The mode of lighting of the STAT and SIG LEDs depends on the module status and provides the information described below. The lighting (ON) cycle of those LEDs lasts approx. 2 seconds and is repeated every 3 seconds, which means that particular lighting cycles are separated by at least one-second (OFF) interval.

STAT - indicates the module status by a corresponding number of flashes with specified duration. Shown symbolically below are single cycles of various LED lighting modes with their meaning described. The shaded fields meaning the LED "on" and the blank fields – the LED "off":

- (LED off) module power off
- no PIN code
- wrong PIN code
- PUK code required
- no communication with SIM300C telephone
- active connection
- normal operation of module
- module restart on switching power on
- PH-SIM PIN code required
- no SIM card
- SIM card damaged
- SIM card busy
- invalid SIM card
- PIN2 code required
- PUK2 code required
- other errors

SIG - indicates level of antenna signal received by SIM300C telephone:

- no cellular network signal
- signal power 1
- signal power 2
- signal power 3
- signal power 4 (maximum signal)
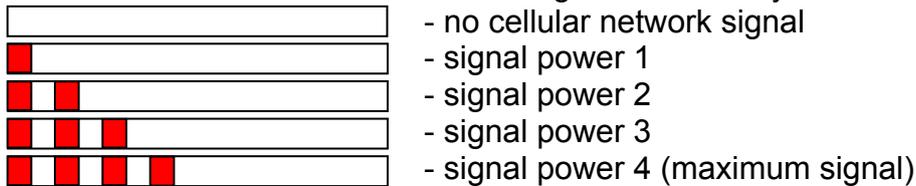
TX, RX - data transmission indicators on RS-232 interface.

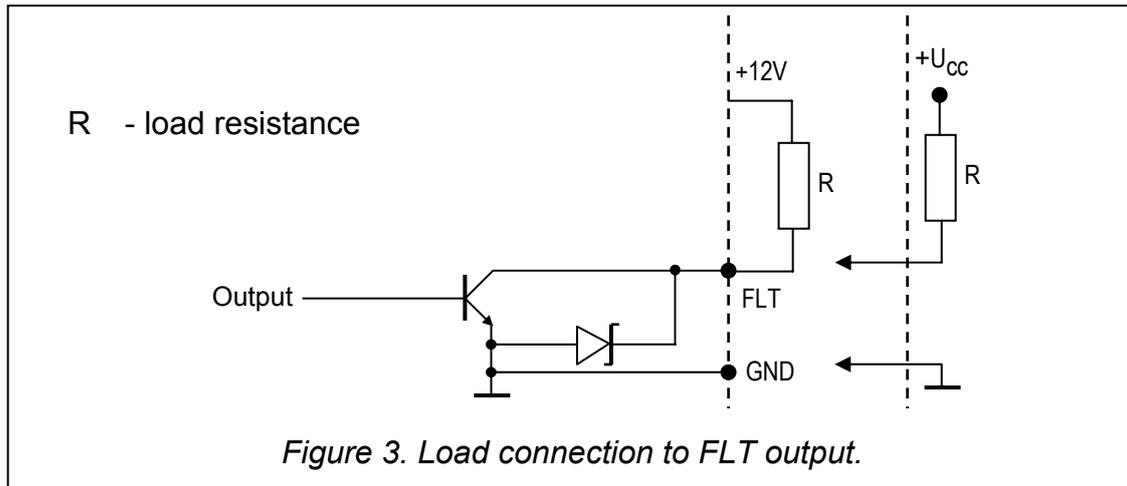In its active state, the **FLT** output is shorted to the ground. The FLT output may be connected to the alarm control panel input, or it can directly control the relay operation (its maximum current-carrying capacity is **50mA**).

Figure 3. Load connection to FLT output.

4. OPERATING THE SIM300C TELEPHONE

As any other cellular telephone, the SIM300C industrial telephone requires a **SIM activation card** to operate. <u>The user of the GSM LT-1S module and the SIM300C telephone has to obtain such a card on his own.</u> The SIM card should be inserted into a special recess provided on the right-hand side of the printed circuit board. The PIN code, if necessary, is to be entered into the module memory by means of a telephone connected to terminals R-1 and T-1, or by means of a computer and the DLOAD10 program. The change of PIN code stored in the SIM card, or entering the PUK code is possible after putting the SIM card into an ordinary cellular telephone.

The PUK code can also be entered into the SIM card from an ordinary telephone set connected to the module terminals R-1 and T-1 (section 9.2, by means of the programming function 16), however, it requires that the PIN code previously saved in the GSM LT-1S be entered into the SIM card. (section 9.2, function No. 01)

When making connection, the telephone transmits its own identifier (ID), unless this option is reserved at the GSM operator (change of option is available via ordinary cellular telephone).

The SIM300C cellular telephone is fitted with a special cable, terminated with connector for external antenna (see Fig. 2).

5. INSTALLATION

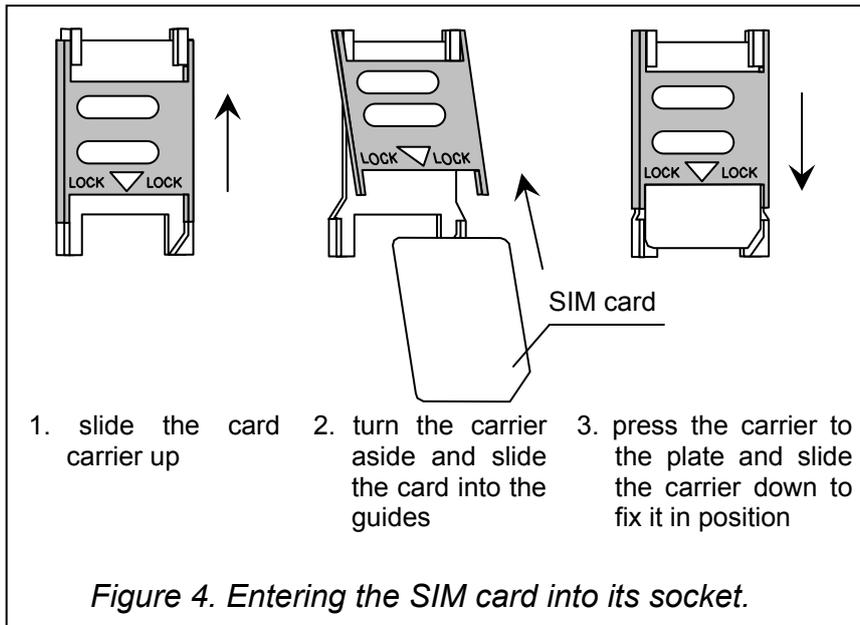It should be borne in mind during installation that the GSM LT-1S module must not be located in the vicinity of electrical installations, since this may involve a risk of malfunctioning. Pay special attention to how the cable is laid between the module and the telephone terminals of the alarm control panel.

⚠ **Never turn on power supply of the module and SIM300C telephone without external antenna connected.**

The installation must be carried out in a strict compliance with the following activation procedure:

1. Make a complete wiring.
2. Turn on the module power supply without SIM card inserted.
3. Using a DTMF telephone set or the DLOAD10 computer program, specify the module working parameters (including the PIN code).
4. Turn off power supply.
5. Insert SIM card into the socket (see Fig. 4).
6. Turn on power supply.

1. slide the card carrier up
2. turn the carrier aside and slide the card into the guides
3. press the carrier to the plate and slide the carrier down to fix it in position

Figure 4. Entering the SIM card into its socket.

The module power supply should have a sufficient current capacity. <u>The recommended power supply unit</u> (e.g. APS-15; APS-30 manufactured by SATEL) <u>should be equipped with its own battery</u>.

It is suggested that the power supply be located within 3m from the module.

If the supply voltage is lower than 9.8V, restart of the module will follow. Therefore, be careful that the module supply voltage never drops during operation below 9.8V at the maximum current consumption.

6. OPERATION OF THE MODULE WITH ALARM CONTROL PANEL AND STATIONARY TELEPHONE

As shown in Figure 1, the module is to be directly connected to the output terminals of the control panel telephone circuit. It maintains impedance and voltage across the R-1 and T-1 terminals as necessary for correct operation of the telephone set. The terminals can be automatically deenergized in case of a loss of communication with the base station (which is accompanied by operation of the FLT trouble indicator – see: programming function No. 17).

When the control panel goes „off-hook", or when a user lifts the handset of a telephone connected to the terminals T-1 and R-1, the module will generate the continuous dialing tone and receive the tone or pulse dialing signals (similarly as the telephone exchange). The telephone number can include digits and special characters: **#** ∗ **+**. The phone number should be dialed just like from a cellular phone, as required by the operator of the network into which the telephone is logged. It is recommended that the number begin with the „+" character and country code prefix (48 for Poland). Sometimes you can dial just the mobile phone number, or the area code and stationary telephone number..

Examples:

    [∗][0][4][8][5][0][1][1][2][3][4][5][6] – connection to mobile phone (with prefix „+48")
    [5][0][1][1][2][3][4][5][6]   – connection to mobile phone (number without prefix)
    [5][8] [1][2][3][4][5][6][7]   – connection to stationary telephone, (in this
                                         example, 58 is location area code)

If the first four digits of the dialed number correspond to the pre-programmed „*pager station number*", the module goes to the procedure of receiving the alphanumeric message and sending it as an **SMS text message** (see section „Sending SMS messages"). Checking of the first four digits is always performed.

When connection is established by the cellular telephone, the module will transmit LF audio signals between the extension line T-1, R-1 terminals and the cellular telephone. After the handset is lifted by the subscriber the connection is established with, the module changes the direct voltage polarization across the extension line terminals T-1 and R-1. This function makes it possible to keep individual tariffication of phone calls.

An option is provided for calling the phone number of the module SIM card. The **incoming calls** to the SIM300C cellular telephone are directed to the extension line terminals R-1 and T-1, which generates the ringing tone, in much the same way as with operation of the cable telephone line. It is then possible to answer the incoming calls by means of a stationary telephone set connected to that telephone line.
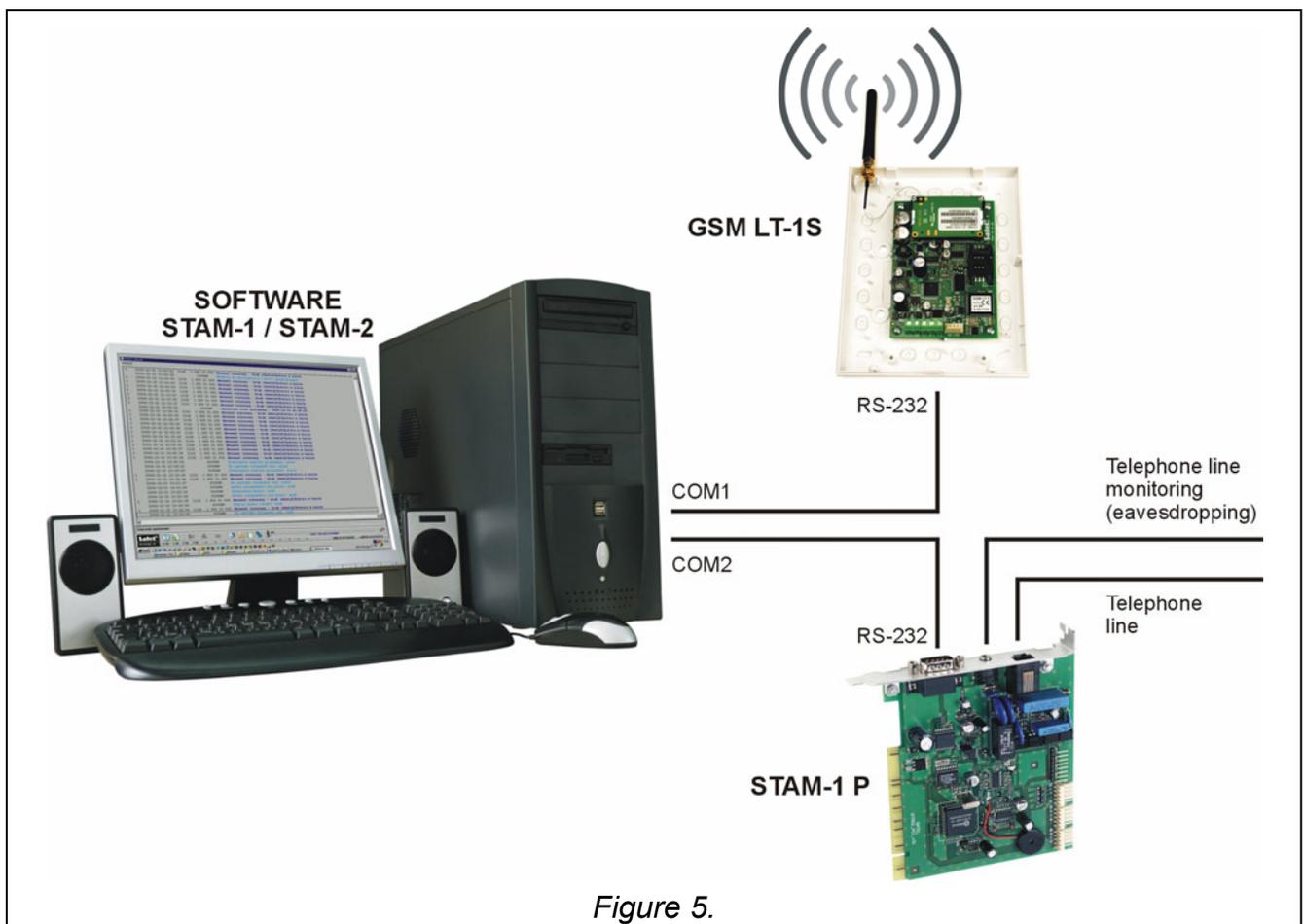
7. GSM LT-1S WITH MONITORING STATION

Figure 5.

The GSM LT-1S module permits site monitoring by means of SMS short text messages. This function is offered by the STAM-1 monitoring station program, version 4.07 and STAM-2,

manufactured by SATEL. The example of module connection to station is shown in Fig. 5. The STAM-1 TRNK expansion board can also be used to connect the module.

Connect the GSM LT-1S module to the computer serial port (COM1 or COM2) or, alternatively, to the RS-232 port on the expansion board, by means of the typical cable for programming the CA-10, CA-64 or INTEGRA control panels.

To make the module interface with the monitoring station, you must enter during setup the communication code, by default 111111. The contents of SMS-messages and the corresponding codes are to be defined in the STAM-1/STAM-2 program when editing the client.

8.   SENDING SMS MESSAGES

An alarm triggered at the protected site can initiate the mode of telephone messaging through the alarm control panel. If the control panel has the function of messaging to the pager system, it can be used for sending SMS messages to the cellular telephone number. The message then sent by the control panel is transferred to the GSM LT-1S module, not to the pager station. For example: the alarm control panel CA-64 or INTEGRA can send messages to three different paging systems. If one of them is assigned to operation with the GSM LT-1S module, the remaining two can perform their normal function.

To enable sending the SMS messages, program in the GSM-LT module the telephone number of Short Message Service Center (function 02 and 10) and telephone number of pager station (function 06), and in the alarm control panel the telephone number of pager station, as required, and enter into the control panel memory the appropriate text to be sent.

The telephone number to be programmed in the control panel must consist of:

1. The "pager station number" pre-programmed in the GSM LT-1S module.
2. The cellular phone number to which the SMS message is to be sent (with the country code prefix, but without the „+" character).
3. The end-of-number character (it is „A" in SATEL control panels).

Note: *Parts of the number may not be separated from each other by any time interval (pause); the digits must be sent by the control panel as one sequence in DTMF or pulse mode. In case the module has any trouble with receiving the „pager" station number in the tone mode, it is necessary to set the **pulse** dialing mode in the control panel.*

8.1   PROCEDURE FOR CONVERTING PAGER MESSAGES INTO SMS MESSAGES

After the alarm control panel goes "off hook" and the number has been dialed – the module checks the first four digits of the number. If they coincide with the "pager station number" programmed in the module, then the module will send a handshake signal (similarly as the pager station) and receive the message sent by the control panel. Next, this message is transmitted via the SIM300C telephone as an SMS text message to the number received from the control panel (the second part of the control panel programmed number).

Note: *The programmed "Pager station number" must be unique and must not coincide with the beginning of other telephone numbers.*

The SMS sending systems may require adding a prefix with the country code (48 for Poland). The prefix (without „+") is to be programmed together with the cellular phone number.

To enable the transmission of SMS messages, the "**SMS center No.**", must be loaded into the module, depending on the GSM network where the telephone is activated. It must be preceded by the „+" character and the country code suitable for the operated network.

Parameters of the pager system signal should be **programmed at the <u>alarm control panel</u>** (or the DT-1 telephone set) as follows:

control panel	1	C	2	2	0	A	0	E	7	0	8	A
DT-1		C	1	2	2	A	0	E	0	0	7	A	8

8.2 SENDING SMS MESSAGES FROM A STATIONARY TELEPHONE SET

The GSM LT-1S module user has an option to send SMS messages form a stationary telephone set which generates DTMF signals and is connected to the terminals R-1 and T-1. This operation is done in much the same way as sending SMS messages in the PAGER system.

In order to send an SMS you should:

1. Lift the handset of the telephone connected to the terminals R-1 and T-1.

2. Dial in one sequence the "PAGER station number" and the phone number to which the SMS is to be sent. The number should be entered rather quickly, without any time intervals between consecutive digits. The addressee telephone number must be identical in form as when receiving by the module of the PAGER message from the control panel (the country prefix must be entered before the cellular phone number).

3. The properly received number is acknowledged in the handset by two beeps generated by the module (the PAGER station responds in the same way). Lack of acknowledgement or a busy signal means a dialing error and then the procedure must be started anew.

4. Enter the text of message following the instructions below (the time of module waiting for subsequent characters is not limited):

   After calling the function, the module will accept characters in the numeric mode. Pressing each key of the telephone adds a corresponding digit to the message.

   By pressing the [∗] key twice you will enter the text mode. In the text mode, each numeric key (from 1 to 9) has three letters assigned to it (see figure 6). Pressing a key means selection of the middle letter. By pressing in turn the key and [∗] you will select the left-hand letter on the given key. The right-hand letter is accessible by pressing the given key and [#]. In order to reach the space, press the [0] key. To reach the dash, press [0][∗], the point – press [1]. In order to change between the text mode and the numeric mode, press the keys [0] and [#]. Pressing the [#] key when the module is in the numeric mode results in ending the programming and sending the message.

Q . Z **1**	A B C **2**	D E F **3**
G H I **4**	J K L **5**	M N O **6**
P R S **7**	T U V **8**	W X Y **9**
∗	‾̣ **0**	**#**

Figure 6. Assignment of alphanumeric characters to telephone keypad.

The GSM LT-1S can store in its memory 62 alphanumeric characters to be sent as an SMS message. At an attempt to enter a longer message, the excessive portion of the text will be omitted. There is no possibility to check the content of entered message. If you hang up the handset when entering the text, the function will be interrupted without sending any SMS.

9. „CLIP" TEST TRANSMISSION

9.1 TEST TRANSMISSION WITHOUT ACKNOWLEDGEMENT

The CLIP type information makes use of the calling number presentation function and may be used to confirm that the GSM LT-1S module is in good working order. This type of messaging consists in dialing a programmed telephone number by the SIM300C telephone and then breaking the connection after approx. 20 seconds. The message recipient can read information on the number of the telephone from which the connection was initiated (cellular phone, ISDN, etc.). If the number is busy, the module will repeat the call. The module will consider the messaging completed, if it does not receive the busy signal within approx. 10 seconds from dialing the number. The cellular phone user has an option to early „reject" the connection, but if he carries out this action too early, the module will repeat the call. Answering the call, either by the user or automatically by the „voice mail", is recognized by the module as completion of messaging, however it entails a toll being charged by the network operator. The module will use this function to complete the test transmission by calling in turn each of the preprogrammed numbers. The phone numbers to be notified should be programmed by means of functions 21 to 24.

When carrying out test transmission in the „without acknowledgement" mode, the module will dial the given telephone number once (provided the number is not busy), irrespective of the programmed number of test transmission attempts (functions 32-35).

As the module has no real time clock, the first test transmission will be carried out approx. 30 seconds after module programming is completed, the second one after randomly chosen time, not exceeding however 20h or the duration of preprogrammed transmission time (depending on which period is shorter). Further transmissions should be performed according to the preset parameter. Use function 19 or 25 for programming time intervals between the test transmissions.

When programming the test transmission data, remember to set the „test transmission priority" (function 20), as appropriate.

Notes:

- *If the cellular phone of the message addressee is OFF or outside the network range, and the voice mail service is inactive, then an automatic message on the existing situation is generated in the receiver and no busy signal is sent back. In such a case, the messaging is considered by the module as completed, while the user loses information on completion thereof.*

- *If the voice mail service is active, the user, after getting access to the network, may be notified, depending on the operator (e.g. by means of an SMS) of the telephone connection with the module number, without leaving any voice message.*

9.2 TEST TRANSMISSION WITH ACKNOWLEDGEMENT

The transmission acknowledgement option (DLOAD10) and, if the transmission is not acknowledged, the SMS send option (functions 36 to 39) can be selected for each of the four telephone numbers to be programmed for the test transmission. The transmission acknowledgement consists in the telephone user rejecting or receiving the connection set up by the GSM LT-1S module. The acknowledgement can only take place within 10 to 20 seconds of the connection set-up. In addition, the number of attempts (1-15) to make the test transmission (functions 32 to 35) can be programmed individually for each telephone number. Having detected the acknowledgement of CLIP transmission, the module will finish dialing the given telephone number. The module will call in turn each of the programmed numbers, starting from the telephone no. 1. If, having completed the programmed number of

attempts in the selected transmission mode with acknowledgement and SMS send, the module fails to detect the acknowledgement, an SMS will be sent by the module to the given telephone number. The message contents can be standard - „CLIP failed" or programmed. The function 40 makes it possible to delete the message contents or to enter a default text, while using the computer and DLOAD10 program you can type in any text.

9.3 SMS CONTROL

Provision is made for a remote change of the test transmission parameters. It is possible to change the transmission period (function 27) and the telephone numbers (functions 28 to 31) to which the transmission is effected. Such a change is possible by sending an SMS message to the module. The module can inform the user about the performed change by sending back an SMS to the telephone number programmed with the function 26. The sent SMS contains information on the current settings (transmission period and 4 valid telephone numbers for test transmission). For the module to send back the SMS, it is necessary to program the SMS center number (function 02).

10. MODULE PROGRAMMING

For the module to operate properly, corresponding parameters must be programmed. The programming is possible by means of a stationary telephone capable of generating DTMF signals, or by using a PC computer and the DLOAD10 program (version 1.00.17 or later).

10.1 PROGRAMMING BY MEANS OF A TELEPHONE SET (DTMF)

The stationary telephone set makes it possible to program all the module operating parameters by means of DTMF signals, as well as enables the module status and antenna signal level to be checked.

In order to change the settings or check the status you should first enter the GSM LT-1S module programming mode. This operation requires entering a six-digit access code. By default, this code is **123456** and can be changed. In case you have forgotten the code after the change, you can only view it or restore it by means of the computer and the Dload10 program.

In the process of programming, the module communicates with the user by means of beeps that can be heard in the telephone handset. These beeps (tones) are symbolically denoted in the function description by means of capital letters:

S   - short beep
L   - long beep

Calling the GSM LT-1S module programming mode:

- Lift the handset of the telephone connected to the module terminals R-1 and T-1 (the telephone must support the DTMF tone system).

- Select the following key sequence on the keypad:

    [*][*][*][*][*][*][?][?][?][?][?][?][*][*][*][*][*][*][#]
    (6 x asterisk;   access code;   6 x asterisk;   #)

- The module will confirm entering the programming mode with four short and one long beeps (SSSSL) hearable in the telephone handset and will wait for individual functions to be called to program the settings. It will remain in the programming mode until the handset is hanged up.

Note: The module accepts the call of programming mode irrespective of the signals it generates in the handset (e.g. the line busy signal can be heard, if there is no SIM card inserted).

Programming the module settings

In order to call the programming function, select the **function number** (two digits), press the [*][*] asterisk key twice, enter the **parameter** suitable for the given function and press the **[#]** key.

The parameter keys are described by means of the **[?]** question marks. The number of question marks is equal to that of the digits of the parameter to be entered in the given function. Where the number of digits is not precisely defined, then such a parameter is described with the **[?...]** symbol (e.g. telephone number).

The numbers of telephones/ PAGER stations may contain special characters: #, *, +. In order to program such a character from the telephone keypad, call the programming function and press successively the two keys:

[*][1] = #

[*][*] = *

[*][0] = +

Entering a correct command is signaled in the handset by three short beeps (SSS), while commands which are incomprehensible or have an incorrect number of characters are signaled by two long beeps (LL).

The function completed, the module returns to the programming mode. If you hang up, the module will quit the programming mode and return to the normal operating mode.

10.2 FUNCTION LIST

[0][1][*][*][?][?][?][?][#]	- SIM card **PIN code** (4 digits). The code saved in module memory does not change the code stored on the SIM card. The [0][1][*][*][#] sequence deletes the PIN code from module memory.
[0][2][*][*][?...][#]	- **SMS center number** - the telephone number necessary for sending text messages. The number of its digits must be within the range of 1...16. The entered number depends on the GSM network, where the telephone is activated. It must be preceded by the country code suitable for the operated network.
	The [0][2][*][*][#] sequence deletes the previously saved SMS center number.
[0][3][*][*][?][?][?][?][?][?][#]	- **SMS password** (6 characters) required for a remote **change of the modem format**. Sending to the module of an SMS containing the [?][?][?][?][?][?]=NN sequence will change the modem operating format available in the SIM300C telephone. The two NN digits define the format as described in the function 08. Using DTMF signals it is possible to program a password comprised of digits only (0...9), while using the Dload10 program you can program a password comprised of both letters and digits. The [0][3][*][*][#] sequence deletes the previously programmed password.
[0][4][*][*][?][?][?][?][?][?][#]	- **SMS password** (6 characters) which calls the **SERV** modem command. The function applies to interaction between the module and the CA-64/INTEGRA alarm control panel. Sending to the module of an SMS containing the programmed password makes the control panel call back to the number saved in its memory as the "Dload64 telephone"/"DloadX

telephone" in order to start the downloading function. If the control panel is to call back to another number, the number should be put into the SMC content as follows: [?][?][?][?][?][?]=dddd. (password, equality sign, telephone number, point). Using DTMF signals it is possible to program a password comprised of digits only (0...9), while using the Dload10 program you can program a password comprised of both letters and digits. The [0][4][∗][∗][#] sequence deletes the previously programmed password.

[0][5][∗][∗][?][?][?][?][?][?][#]   - **SMS password** (6 characters) which calls the **USER** modem command. The function applies to interaction between the module and the CA-64/INTEGRA alarm control panel. Sending to the module of an SMS containing the programmed password makes the control panel call back to the number saved in its memory as the "Guard64 telephone"/"Guard64 telephone" in order to start the remote communication with the GUARD64/GUARDX program. If the control panel is to call back to another number, the number should be put into the SMS content as follows: [?][?][?][?][?][?]=gggg. (password, equality sign, telephone number, point). Using DTMF signals it is possible to program a password comprised of digits only (0...9), while using the Dload10 program you can program a password comprised of both letters and digits. The [0][4][∗][∗][#] sequence deletes the previously programmed password.

Note: *The message sent to the module may contain just the SMS password, but it can also be longer than the password (the password can be part of a longer word). It is important that the password be inserted in the initial part of the message text (among the first 32 characters). This feature makes it possible to load a verbal description of the performed operation into the memory of the telephone from which the SMS will be sent. Thus the user does not need to remember the passwords and their corresponding functions.*
Only one control password can be sent in one message. Sending an SMS without any password will cause no reaction of the module. The received message will be deleted, and the telephone will be ready for reception of a next text message.

[0][6][∗][∗][?][?][?][?][#]   - **PAGER station number** (4 digits). If the module detects these digits at the beginning of the dialed number, it will handle the further part of the number as the number of cellular phone to which it is necessary to send the SMS. The SMS contents should be transmitted by the alarm control panel in the "pager" system form. The [0][6][∗][∗][#] sequence will delete the number.

[0][7][∗][∗][?][?][?][?][#]   - **CA-64 station number** (4 digits). This function is not used. It applies to interaction with the CA-64 control panel. The [0][7][∗][∗][#] sequence will delete the number.

[0][8][∗][∗][?][?][#]   - **modem standard format** (2 digits) - the format in which the module will communicate with the modem of service / user computer. The format code is to be entered as two digits according to the table below:

format code	modem format
00	auto
01	300 V.21
02	1200 V.22
03	1200/75 V.23
04	2400 V.22bis
05	2400 V.26ter
06	4800 V.32
07	9600 V.32
12	9600 V.34
14	14400 V.34
65	300 V.110
66	1200 V.110/X.31
68	2400 V.110/X.31
70	4800 V.110/X.31
71	9600 V.110/X.31
75	14400 V.110/X.31

[0]9][*][*][?][#]   - **RS-232 port speed.** Parameter defining the rate of data transfer between the module and the control panel / computer. You should enter a digit to define one of the following rates:

0 – 4800 bps

1 – 9600 bps

2 – 19200 bps

[1][0][*][*][?][#]   - **SMS center international number**. The option indicates whether the programmed SMS center number is a full international number.

0 – no (for local networks)

1 – yes (recommended)

[1][1][*][*][?][#]   - **Fax/Modem**. Option indicating whether the user permits a modem transmission to be carried out by the module. You should program one of the following values:

0 – modem transmission disabled

1 – modem transmission enabled

[1][2][*][*][?][?][?][?][?][?][#] - **access code** (6 digits) for programming the module by means of a telephone set. The [1][2][*][*][#] sequence will delete the code i.e. deny the access to programming. When you delete the code and quit the programming mode, you will only be able to change the settings and restore the code by using a PC computer and the Dload10 program.

[1][3][*][*][1][2][3][4][#]   - **restore default settings** - the default access code for module programming is **123456.**

[1][4][*][*][#]   - **check antenna signal strength**. The module, by means of handset beeps, informs the user about the level of received

antenna signal. The signaling is same as that of the **SIG** LED.
The following answer beeps are possible:

two long (LL) – antenna signal strength = 0

one short (S) – antenna signal strength = 1

two short (SS) – antenna signal strength = 2

three short (SSS) – antenna signal strength = 3

four short (SSSS) – antenna signal strength = 4 (maximum)

[1][5][∗][∗][#] - **check telephone status**. The module informs the user about
its status. The signaling is same as that of the **STAT** LED. The
following answer beeps are possible:

four short (SSSS) – no SIM PIN code

three short (SSS) – wrong SIM PIN code

short and long (SL) – SIM PUK code required

two short (SS) – no communication with SIM300C module

one short (S) – module operation OK

two long (LL) – module restart after power-up

two short and one long (SSL) – PH-SIM PIN code required

eight short (SSSSSSSS) – no SIM card

three long (LLL) – SIM card damaged

four beeps of diminishing length (LISs) –SIM card busy

three short and one long (SSSL) – SIM PIN2 code required

four short and one long (SSSSL) – SIM PUK2 code required

one long, three short and one long (LSSSL) – other error

[1][6][∗][∗][?][?][?][?][?][?][?][?][#]   - **enter PUK code** (8 digits) into the SIM card. This
function can only be performed when the module status
indicates (by LED or beeps) that the PUK code is required.
This code is not stored anywhere, but after entry it is
transferred to the SIM. When the PUK is entered and the
telephone is unblocked, the PIN code currently programmed in
the module settings will be loaded into the SIM memory.
If the PIN code has not been programmed at all in the module
settings, the PUK will not be transferred to the SIM300C. Entry
of a correct PUK code will be confirmed by three short beeps
(SSS) - this confirmation will appear after a few seconds' delay
because of the data processing in the SIM300C telephone.

[1][7][∗][∗][?][#] - deenergizing the telephone line together with signaling fault at
the FLT output:

0 – do not switch off voltage on telephone line terminals,

1 – switch off voltage on telephone line if FLT is active.

[1][8][∗][∗][?][#] - generating the routing signal (sound signal for setting up
connection):

0 – routing signal OFF,

1 – routing signal ON.

[1][9][∗][∗][?][#] - **test transmission**. The function enters the period of CLIP test
transmission in a simplified way. The following values can be
entered:

0 – no test transmission,

	1 – test transmission	2h58min,
	2 – test transmission	5h57min,
	3 – test transmission period	11h56min,
	4 – test transmission period	23h55min,
	5 – test transmission period	2d23h53min,
	6 – test transmission period	6d23h30min.

[2][0][*][*][?][#] — **test transmission priority**. This option determines whether the test transmission will override the call being just carried out by the module. If yes, the current connection will be terminated whenever there is a need for the test transmission. If no, the test transmission will be carried out on completion of the call by the control panel/user:

0 – no,

1 – yes.

[2][1][*][*][?...][#] — **telephone number 1 for the test transmission**. The number of digits must be within the range of 1...16. The number should be programmed with „+" at the beginning, followed by the country code. The [2][1][*][*][#] sequence will erase the previously saved telephone number.

[2][2][*][*][?...][#] — **telephone number 2 for the test transmission**. The number of digits must be within the range of 1...16. The number should be programmed with „+" at the beginning, followed by the country code. The [2][2][*][*][#] sequence will erase the previously saved telephone number.

[2][3][*][*][?...][#] — **telephone number 3 for the test transmission**. The number of digits must be within the range of 1...16. The number should be programmed with „+" at the beginning, followed by the country code. The [2][3][*][*][#] sequence will erase the previously saved telephone number.

[2][4][*][*][?...][#] — **telephone number 4 for the test transmission**. The number should be programmed with „+" at the beginning, followed by the country code. The number of digits must be within the range of 1...16. The [2][4][*][*][#] sequence will erase the previously saved telephone number.

[2][5][*][*][?][?][?][?][?][?][#] — **test transmission period** (6 digits: ddhhmm). As distinct from function 19, this function enables any transmission period to be entered. The programmed digits have the following meaning:
dd – number of days (max. 31),

hh – number of hours (max. 23),

mm – number of minutes (max. 59).

Programming zeros only will reset the test transmission.

[2][6][*][*][?...][#] — **telephone number to confirm SMS control**. The number to which the module will send an SMS to inform about the current settings, provided that the user has changed the settings by means of an SMS. The telephone number must be preceded by the „+" character and country code, corresponding to the currently used GSM network.

[2][7][*][*][?][?][?][?][?][?][#] — **SMS password** (6 characters) makes it possible to remotely change the **test transmission period**. Sending to the module

an SMS with the [?][?][?][?][?][?]=P sequence, where P is a parameter corresponding to the description contained in function 19, will save the new parameter, programmed with function 19, in the module memory. Using the DTMF signals, you can program passwords composed from digits only (0...9), whereas the Dload10 program makes it possible to program passwords composed from letters and digits. The [2][7][*][*][#] sequence will erase the previously programmed password.

[2][8][*][*][?][?][?][?][?][?][#] - **SMS password** (6 characters) makes it possible to remotely change the **telephone number 1 for test transmission**. Sending to the module an SMS with the [?][?][?][?][?][?]=nnnn. sequence (password, equality sign, telephone number, dot), where **nnnn** is the new **telephone number 1 for test transmission,** will change the parameter programmed with function 21. The new telephone number must be identical in form to that programmed with the appropriate function. Using the DTMF signals, you can program passwords composed from digits only (0...9), whereas the Dload10 program makes it possible to program passwords composed from letters and digits. The [2][8][*][*][#] sequence will erase the previously programmed password.

[2][9][*][*][?][?][?][?][?][?][#] - **SMS password** (6 characters) makes it possible to remotely change the **telephone number 2 for test transmission**. Sending to the module an SMS with the [?][?][?][?][?][?]=nnnn. sequence (password, equality sign, telephone number, dot), where **nnnn** is the new **telephone number 2 for test transmission,** will change the parameter programmed with function 22. The new telephone number must be identical in form to that programmed with the appropriate function. Using the DTMF signals, you can program passwords composed from digits only (0...9), whereas the Dload10 program makes it possible to program passwords composed from letters and digits. The [2][9][*][*][#] sequence will erase the previously programmed password.

[3][0][*][*][?][?][?][?][?][?][#] - **SMS password** (6 characters) makes it possible to remotely change the **telephone number 3 for test transmission**. Sending to the module an SMS with the [?][?][?][?][?][?]=nnnn. sequence (password, equality sign, telephone number, dot), where **nnnn** is the new **telephone number 3 for test transmission,** will change the parameter programmed with function 23. The new telephone number must be identical in form to that programmed with the appropriate function. Using the DTMF signals, you can program passwords composed from digits only (0...9), whereas the Dload10 program makes it possible to program passwords composed from letters and digits. The [3][0][*][*][#] sequence will erase the previously programmed password.

[3][1][*][*][?][?][?][?][?][?][#] - **SMS password** (6 characters) makes it possible to remotely change the **telephone number 4 for test transmission**. Sending to the module an SMS with the [?][?][?][?][?][?]=nnnn. sequence (password, equality sign, telephone number, dot), where **nnnn** is the new **telephone number 4 for test**

transmission, will change the parameter programmed with function 24. The new telephone number must be identical in form to that programmed with the appropriate function. Using the DTMF signals, you can program passwords composed from digits only (0...9), whereas the Dload10 program makes it possible to program passwords composed from letters and digits. The [2][8][*][*][#] sequence will erase the previously programmed password.

[3][2][*][*][?...][#] - number of attempts to send test transmission to telephone no. 1. You can program from 1 to 15 attempts.

[3][3][*][*][?...][#] - number of attempts to send test transmission to telephone no. 2. You can program from 1 to 15 attempts.

[3][4][*][*][?...][#] - number of attempts to send test transmission to telephone no. 3. You can program from 1 to 15 attempts.

[3][5][*][*][?...][#] - number of attempts to send test transmission to telephone no. 4. You can program from 1 to 15 attempts.

[3][6][*][*][?][#] - performance of test transmission to telephone no. 1:

0 – test transmission without acknowledgement,

1 – test transmission with acknowledgement,

2 – test transmission with acknowledgement and SMS send, when there is no acknowledgement.

[3][7][*][*][?][#] - performance of test transmission to telephone no. 2:

0 – test transmission without acknowledgement,

1 – test transmission with acknowledgement,

2 – test transmission with acknowledgement and SMS send, when there is no acknowledgement.

[3][8][*][*][?][#] - performance of test transmission to telephone no. 3:

0 – test transmission without acknowledgement,

1 – test transmission with acknowledgement,

2 – test transmission with acknowledgement and SMS send, when there is no acknowledgement.

[3][9][*][*][?][#] - performance of test transmission to telephone no. 4:

0 – test transmission without acknowledgement,

1 – test transmission with acknowledgement,

2 – test transmission with acknowledgement and SMS send, when there is no acknowledgement.

[4][0][*][*][?][#] - contents of SMS sent in case of no acknowledgement:

0 – delete SMS contents,

1 – enter default contents: „CLIP failed".

Note: The DLOAD10 program makes it possible to enter any contents of the SMS informing the CLIP test transmission acknowledgement has not been received.

[6][6][*][*][7][8][9][0][[#] - module test mode. Calling the function will extinguish all the LEDs. Then the LEDs will go on for about 1 second in the following sequence: STAT, SIG, TX, RX. Next, the FLT output will activate.

11. DLOAD10 PROGRAM

The GSM LT-1S module is delivered together with the DLOAD10 program which enables the module to be programmed from a computer.

The program is designed for IBM PC/AT compatible computers. It works in any computer hardware configuration in the **WINDOWS** (9x/ME/2000/XP) environment. It is recommended that the program be installed on the computer hard disk.

The GSM LT-1S module communicates with the computer via the RS-232 interface.

Figure 7. Connection of computer to module serial port.
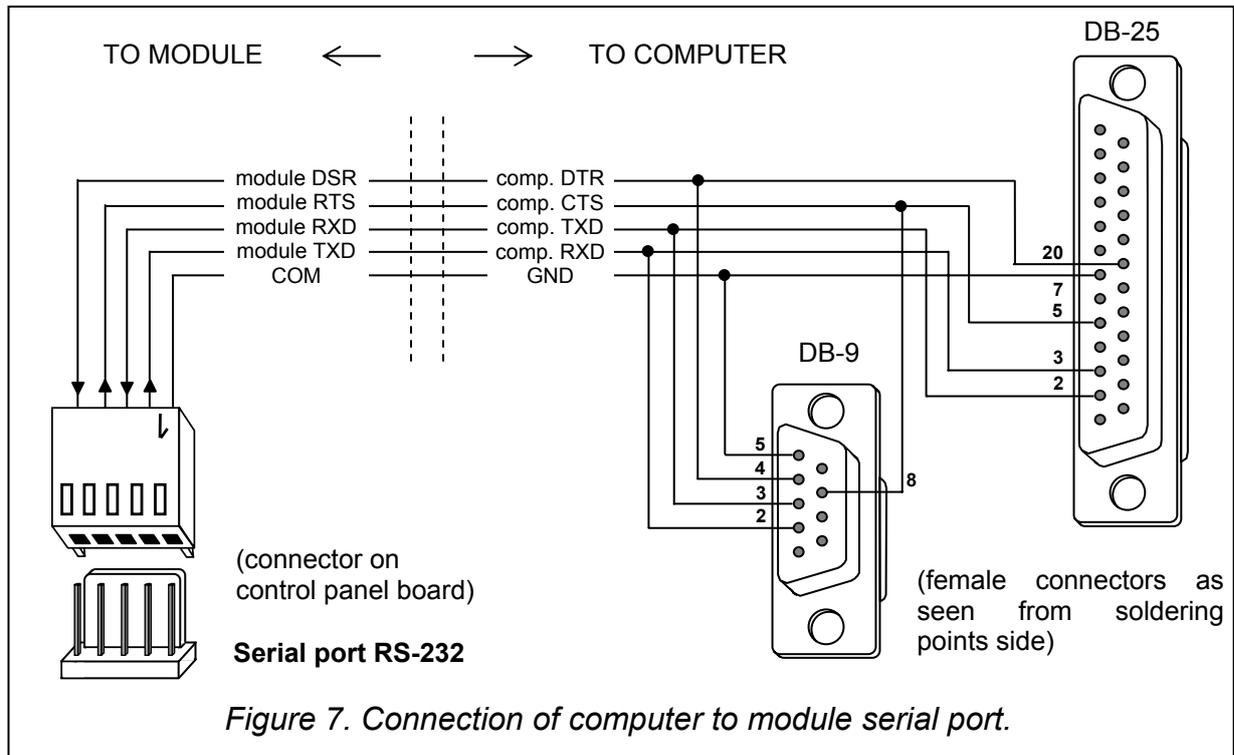
For installation of the program run the **setup.exe** program from a floppy disk delivered with the module. Having installed the program, start it. Access to the program is protected with an **access code.** After installation of the program, the access code is: **1234** and can be changed in any string of 16 alphanumeric characters. As long as the code has its factory setting, pressing the „ENTER" key (without entering any code) will start the program with the default access code (1234).

In order to establish communication between the DLOAD10 program and the module, you should follow the procedure below:

1. Open the window with module data by selecting **File→New device→GSM 4/LT module** in the program menu (see figure 8).
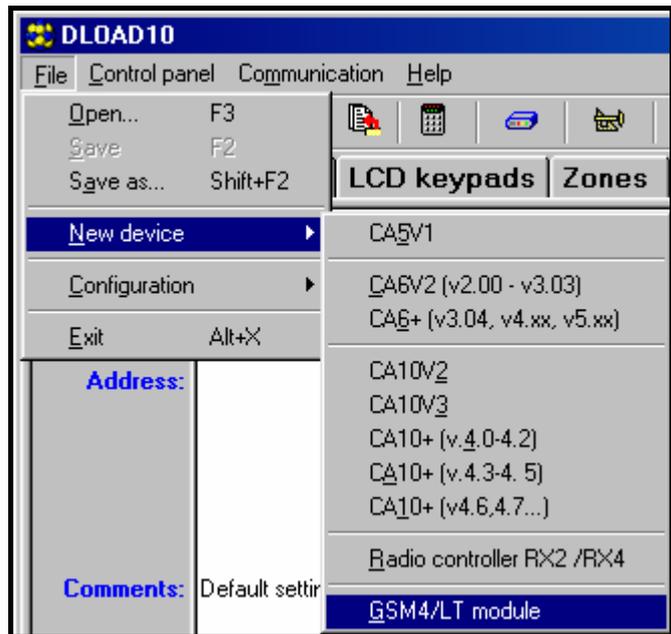
Figure 8.

2. Enter the options of module communication settings by clicking on the ⛟ icon (or through the **Communication→Configuration** menu) and select the port through which the computer connects with the module RS-232 port (see figure 9).
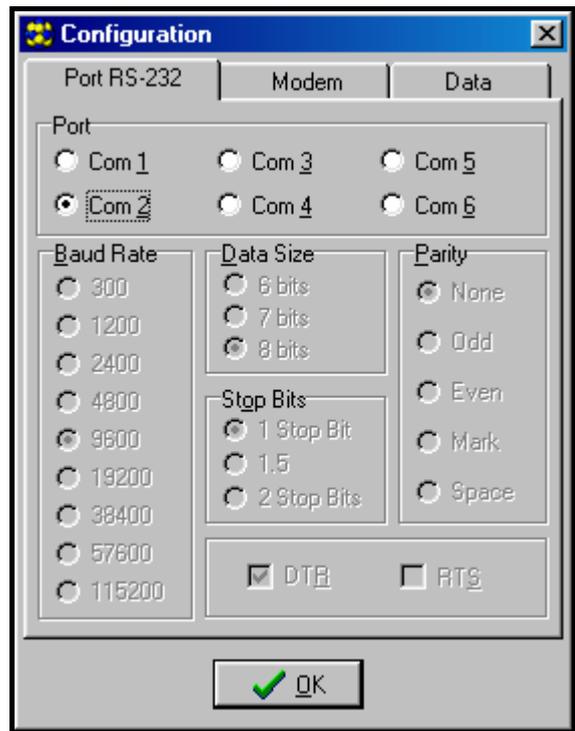

Figure 9.

3. Read out data from the module by clicking on the 🔳 icon.

4. Program the module. Figure 10 shows the window for programming the module settings. The parameter values in the drawing are just an example. The data related to test transmission and SMS control, as well as the PIN code, are not programmed by default. Particular parameters are described in Section „Module Programming". The line in the upper part of the window shows the current status of the module as well as the antenna signal level.
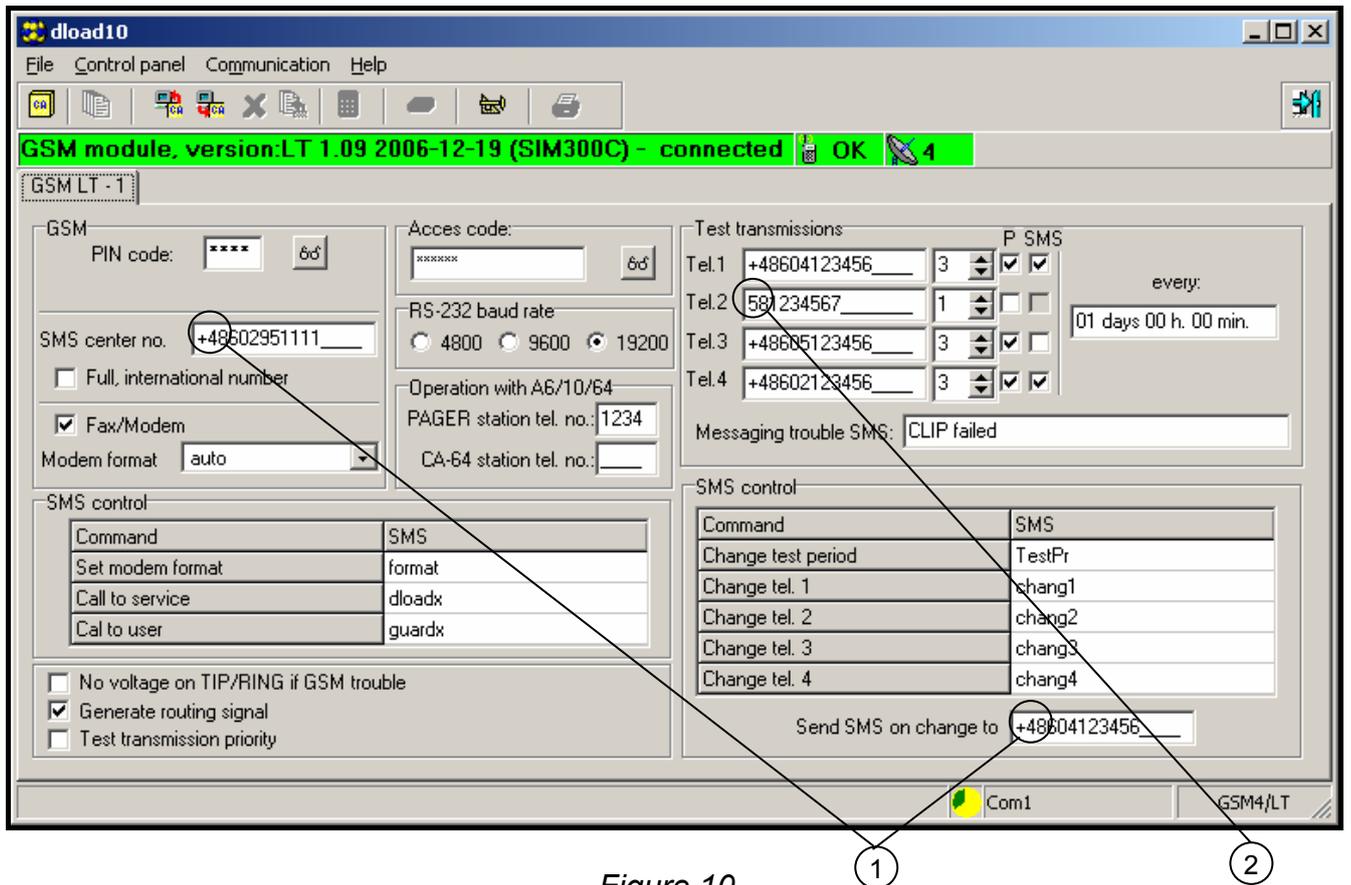
Figure 10.

Description of parameters indicated in the illustration above:

    1 – country code (48 – Poland)
    2 – area code to be entered in case of connection to a stationary telephone (58 – Gdańsk)

5. Save new data in the module by clicking on the 🖥 icon.
6. If necessary, the programmed data can be saved as a file on the computer disk.
7. Disconnect the cable used for programming.

Note: Never carry out functional test of the module with cable connected to RS port.

12. TECHNICAL DATA

Supply voltage .... 12V DC ±15%
Average current consumption in the SIM300C telephone standby mode 100mA
Average current consumption in the SIM300C telephone active mode 250mA
Required minimum output current, power supply unit.. 500mA
Current-carrying capacity, FLT output 50mA

ATTENTION: The SATEL Company recommends that performance of the GSM LT-1S communication module be regularly tested. An efficient GSM module, which interacts with the security system, greatly increases the chance of successful transmission of alarm information. However, for reasons beyond the Manufacturer's control, it cannot be a 100% source of such information.

13. HISTORY OF THE MANUAL UPDATES

The described changes refer to the manual for the module GSM LT-1 with firmware version v1.07.

DATE	VERSION	INTRODUCED CHANGES
December 2006	1.09	Adaptation of the module to interact with SIM300C industrial cellular telephone. Extended description of module properties (p. 2). Changed contents of section 6 (p. 6). Supplemented contents of section 9.1 (p. 10) and added section 9.2 (p. 10). Replaced list of available modem formats in function 08 (p. 13). Introduced new parameter values in function 19 (p. 15). Extended description of functions 21 to 24 (p. 16). Introduced description of new functions 26-40 (p. 18). Updated Figure 10 (p. 21).

IMPORTANT:

PIN................................. **PUK** ....

Telephone No....

....

....

....