![TELL logo]

GSM Adapter *Mini*

Installation and User Manual

for module version 2.02 and higher
Rev 1.2 01.06.2010

Application area

- Connecting an alarm control panel to monitoring station with Contact ID communication through GSM network

- Security reserve (secondary signal) for the already existing PSTN communicators

- Wired telephone adapter for flats, houses, cottages

- A simple emergency alarm for elderly sick people by picking up the receiver

- Remote diagnostics of centres built to long distances

Features

- Analogue telephone line simulation to transfer Contact ID signals and voice

- Handling of landline (PSTN), in case of its cessation altering to GSM line simulation

- Generating SMS message from the Contact ID codes of monitoring station reports (alarm, arming, disarming…)

- Automatic dial of pre-set telephone number as a result of picking up the receiver (emergency call function)

- **Bell 103 / V.21** digital data communication
  The alarm control panel becomes programmable through GSM data call (remote maintenance, downloading event code, etc.)

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1   Main functions of the GSM Adapter

The main function of the GSM Adapter Mini is to interface to GSM network an alarm system that can report to security monitoring station through PSTN telephone line.

The GSM Adapter makes possible the installation of alarm systems in places where landline (PSTN) is not available, but it is necessary to send report to security monitoring station.
By means of GSM transmission, the adapter improves the reliability of alarm reporting in cases when the PSTN alarm transmission does not work or fails (e.g. when the phone lines are tampered or the telephone service is suspended due to technical reasons).

1.1   Additional features

- Receiving incoming telephone calls, possibility of restricting incoming calls
- Setting installations to sub-stationary networks
- Synchronizing PSTN and GSM telephone calls with different prefix numbers
- Forwarding information of GSM account balance of prepay SIM card
- Converting alarm codes into SMS messages
- Emergency call function
- Interfacing voice diallers
- Remote programming of alarm systems

# 2   Setting the parameters of the Adapter

Setting the parameters of the module is possible via USB connection using the „**GSM_Adapter_Remoter_vxxx.exe**" software. The language of the program can be selected by clicking on the language icons in the bottom right corner of the program window.
If necessary, the version of the programming software can be updated by clicking on the "***Search for program updates***" link on the "***Connection***" page. The update procedure requires internet connection. It can be also set here, if the program should search for updates automatically on each opening, or this is performed manually by clicking on the search link.

Setting parameters through USB connection:

- Start „ **GSM_Adapter_Remoter_vxxx.exe**" software
- Power up the module
- Connect the module to the PC using the enclosed USB cable
- When connection is established a green tick icon appears in the upper right corner of the program window and module version is displayed in the program header
- After this, downloading, uploading and monitoring functions become available
- When programming is finished, disconnect the USB cable from the module

2.1 Module state monitoring
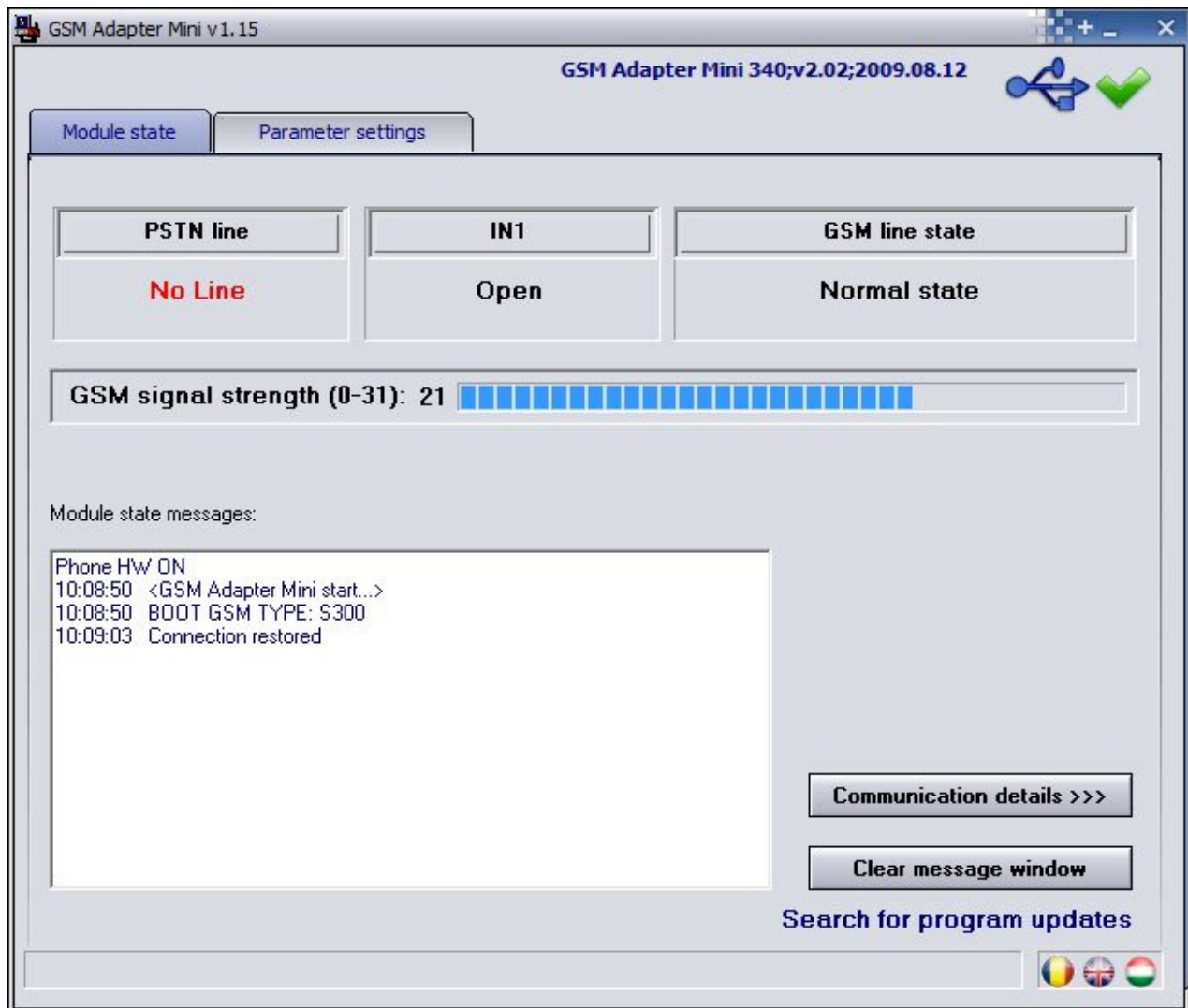
When connected, the module's current state can be monitored in the "**Module state**" window. The following information are displayed: the availability of landline phone, state of the input, the GSM line state, the GSM signal strength and the module state messages. The module message window can be cleared by pressing "**Clear message window**" button.

PSTN Line: if there is a PSTN phone line connected to the correspondent module terminals, then it is displayed whether it is available or not

IN1: shows the state of the IN contact input

GSM line state: displays the state of the GSM line, whether it is in use or not

GSM signal strength: displays the current GSM signal strength on a 31-point graphical scale

Module version: the version of the connected module is displayed in the header of the program window. The example in the picture above shows the following information:

GSM Adapter Mini: module type
v2.02: firmware version
2009.08.12: firmware issue date (12.08.2009)

2.1.1 Communication details

By pressing the "**Communication details**" button a new window appears where the tasks and processes running in the module can be traced.
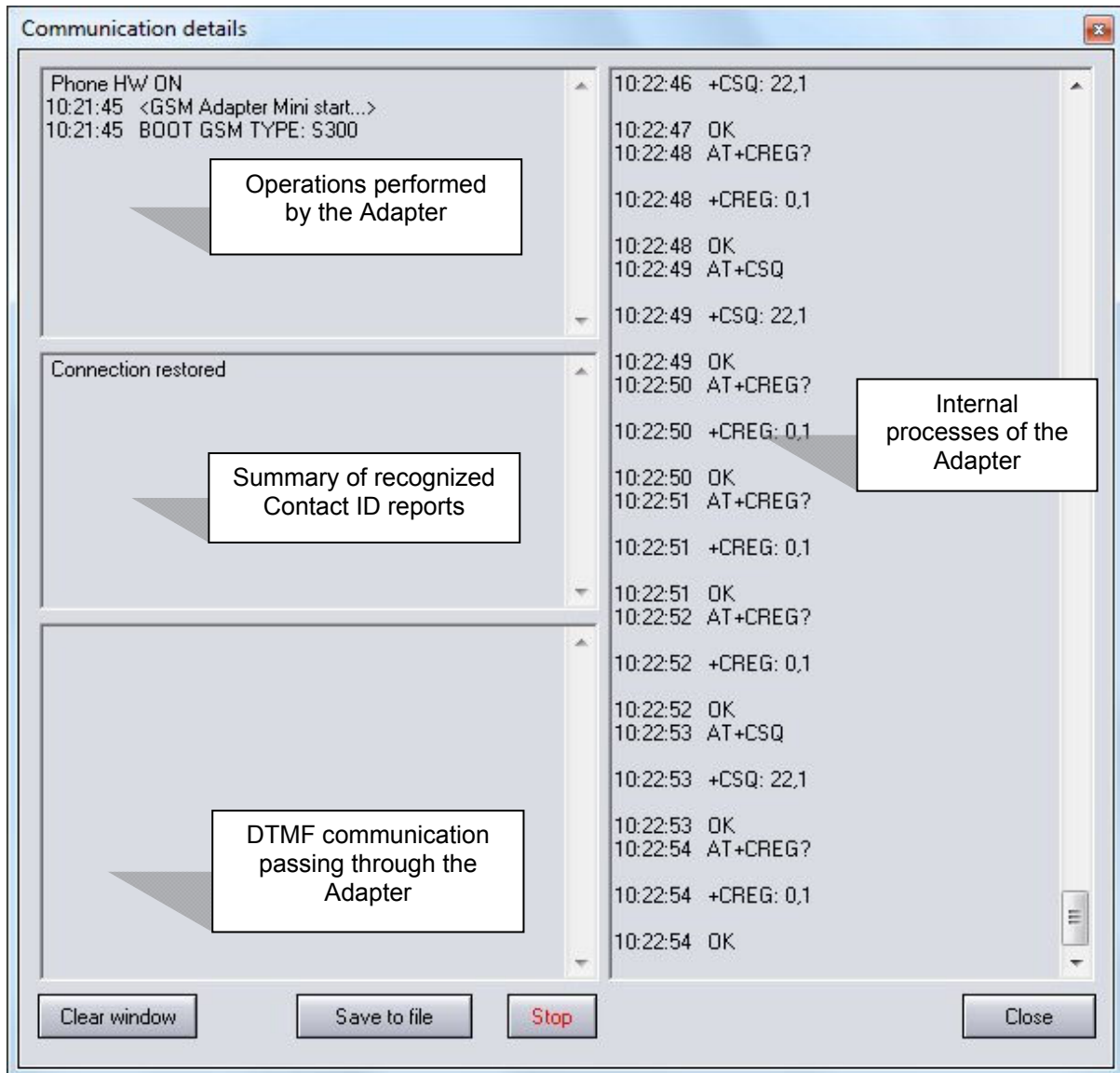
In the left side of the window (divided part) the bidirectional communication is displayed, while in the right side the module's internal processes are shown.

Clear windows: clears the content of all windows (does not have effect on the module's operation, only on display)

Save to file: saves the whole content of all windows to text file

Stop/Start: stops and starts the data flow being displayed (does not have effect on the module's operation)

Close: closes the communication details window.

2.2 Parameter settings

In this menu saved settings can be loaded from files, saved to files or loaded to or from the module or compared using the corresponding icon buttons.

For the basic operation of the unit, no setting is necessary. So GSM line simulation and handling of PSTN line are automatic.

However, if it is requested, in order to reach the additional functions of the adapter as detailed in the following sections, it is required to set certain parameters (e.g. the owner's phone number, the number to be dialed to access the external PSTN line, the texts of SMS messages, etc.)

2.2.1 Setting phone numbers
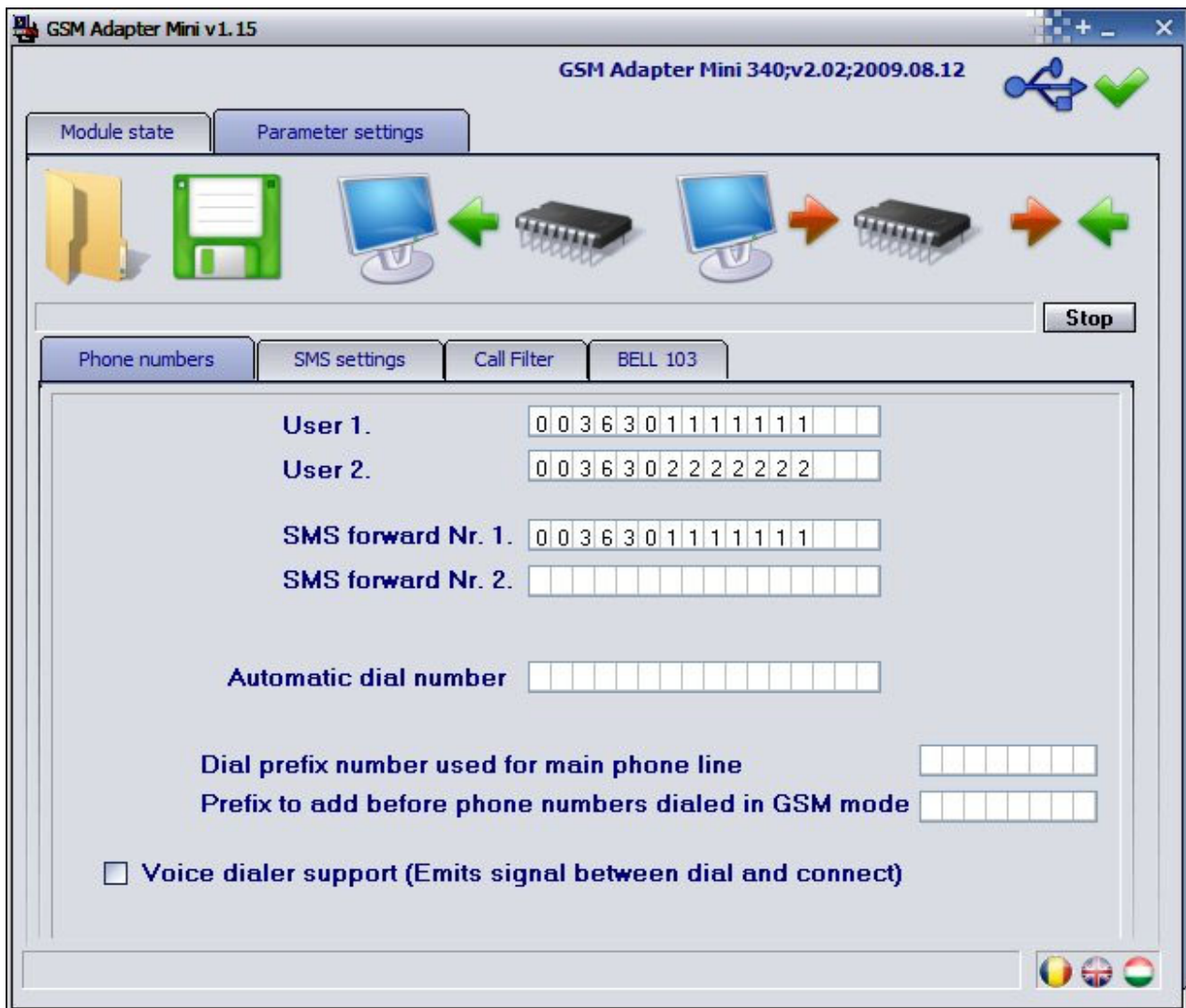
- **User phone numbers**

Two user phone numbers can be set to which the GSM Adapter sends SMS message with the text specified in "**SMS settings**" window, when the Adapter receives from the alarm control panel a Contact ID event code that is also specified in the list, in the row assigned to the relevant SMS text.

- **SMS forward Nr. - forwarding incoming SMS messages**

It is possible to forward messages incoming to the Adapter's SIM card up to two owner or user phone numbers. This makes the use of cheap non-subscription cards safe.
If the incoming SMS has been successfully forwarded, it will be deleted from the SIM card to make space for further incoming messages.
Attention! Never enter here the phone number of the SIM card placed into the module, because this would initiate an infinite loop of SMS sent to itself right after the first incoming SMS, causing significant expense!

- **Automatic dial number**

This function can be used in certain, specific tasks (e.g. emergency telephone calls). The appropriately set module shall immediately initiate a call to the preset number through GSM network when the receiver is picked up.

- **Setting a prefix number necessary to access external PSTN line in case of using a telephone subsystem**

If the module's PSTN line input is connected to a telephone subsystem where the dialing of a prefix number (e.g. 9) is necessary to access the external PSTN main line, this number must be entered on the adapter. So the module omits the prefix number (e.g. 9) in case of telephone calls through GSM network, however, it naturally initiates the call starting with the prefix number (e.g. 9) in case the call is directed through a PSTN line.

- **Cases when the prefix number necessary to access GSM and PSTN is different**

Another prefix number can be set for the module to insert in front of the dialed number in all those cases when the call is directed through GSM network. (e.g. if the panel calls the PSTN local number without the area code, a prefix can be assigned that is necessary to initiate calls through GSM network.)
(This function came to be important because of some special characteristics of foreign PSTN networks.)

- **Voice dialler support**

One main characteristic of speech diallers is that they start playing the message in a certain time, if no ringtone can be heard in the line.
By setting this function, you will hear a simulated tone signal until the real ringtone can be heard. This way can be avoided that the speech dialler starts to play the message before the call is received.

2.2.2 SMS settings - sending SMS messages in case of alarms or other events

The GSM Adapter continuously watches the calls initiated through the GSM network, and notices the reports of **CONTACT ID** or **ADEMCO Express** formats. If it observes any of the specified event codes (maximum 10), it will send an assigned SMS message to one or two telephone numbers that has been set by the user. The text of the message to be sent can be set by the user.
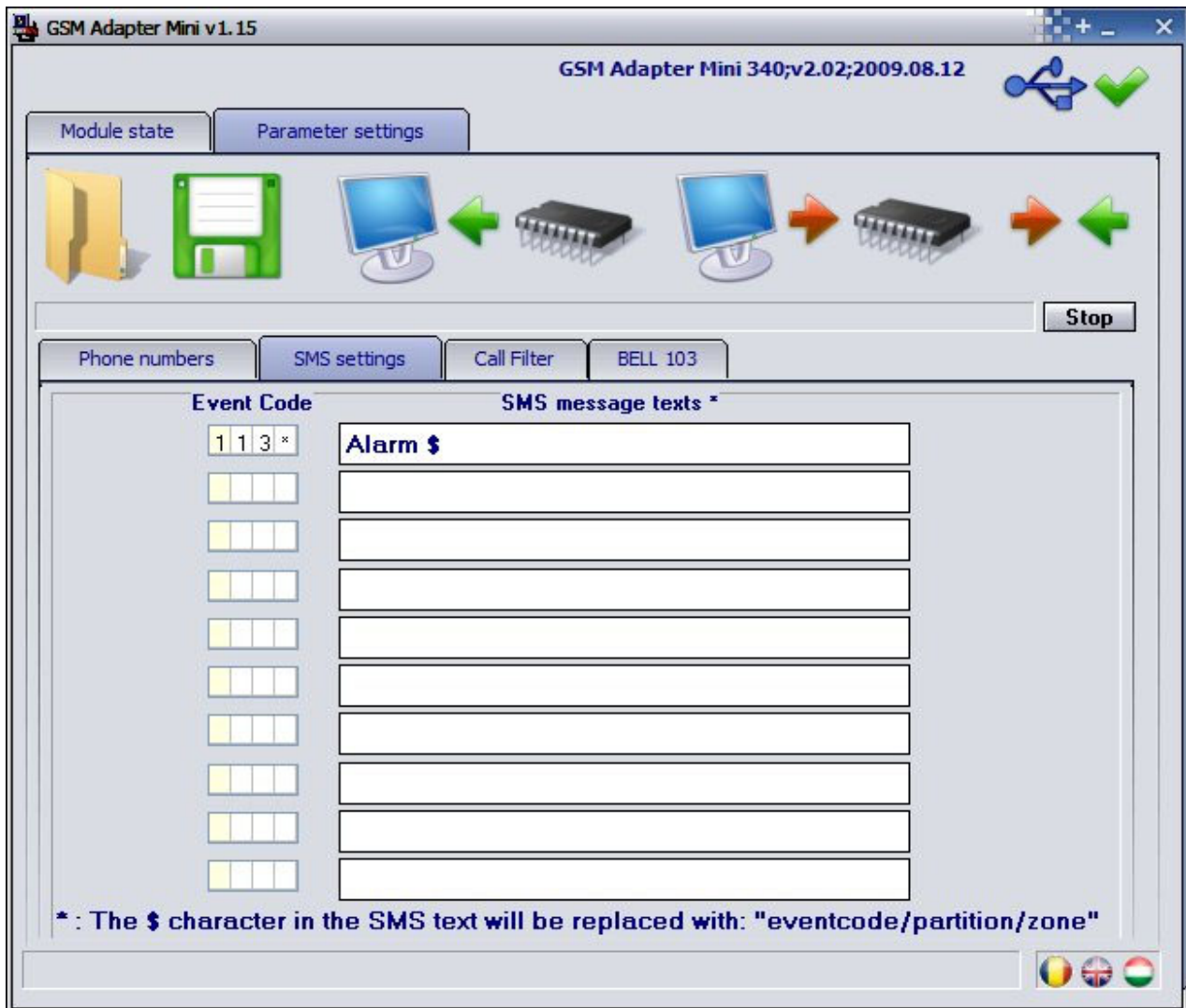
The event codes can be found in the alarm control panel's installer's manual. The event codes in the list must consist of 4 hexadecimal digits each, where the first digit makes the difference between new event ("1") and restoration event ("3").

When entering event codes in the list, code groups can be specified as well with the use of "✳" character within the codes. This means it is indifferent what character is received from the alarm control panel in the place substituted with "✳" character but the rest of the code corresponds to the one in the list, the relevant event will be transmitted.

Note: the module does not perceive signals sent through the PSTN line.

Note: in case of entering ADEMCO-Express event codes in the "**GSM_Adapter_Remoter_vxxx.exe**" software, double 0 shall be inserted before the code. E.g. 31 = in case of alarm, you shall enter 0031 in the list.

- **Sending SMS messages on event, without being connected to a monitoring station**

If reporting to a monitoring station is not requested, it is still possible to send SMS messages in case of some events. To do this, enter **123456789** instead of the telephone number of the monitoring station into the alarm control panel. In case of alarm, the alarm control panel will dial this number and the GSM Adapter module will not initiate a real phone call, but will simulate the operation of the monitoring station (gives out handshake signals and acknowledges CONTACT ID and ADEMCO Express event codes).

This way it is possible to send SMS messages from the received signals as described in the previous section.

2.2.3 Call filter - receiving calls through the GSM network

The GSM Adapter Mini is able to manage calls coming in through the GSM network, and to ring up devices (telephone, alarm system) connected to it. With this, it can receive incoming GSM calls in places where there is no PSTN line extension by means of a simple analogue telephone.

This function works only if there is no PSTN line connected to the module and the **IN** (DIRECT GSM) input is not activated (short-circuited).

It is also possible to filter incoming voice calls by phone number, which means the Adapter will accept incoming voice calls only from the specified phone numbers. In this case voice calls initiated from other phone numbers will be rejected.

Attention! In case of using telephone number filtering, do not specify the inland area changing prefix before the telephone number, only the area code and the phone number. (The telephone uses international format +3630… while displaying telephone numbers. The module compares the received telephone number with the filtered telephone number by starting to compare them from the last digits. The module handles the two numbers as identical even if +36 is left out.

There is also a possibility to limit the duration of incoming calls between 0 and 25 minutes/call. If value 0 is entered, the duration of incoming calls is unlimited.

2.2.4 Remote programming with BELL 103 / V.21 format

The GSM Adapter Mini uses GSM voice channel, which has 13 kbit/s bandwidth, for calls and monitoring station signals. However, the original sound source is 64 kbit/s, which has been composed to the mentioned value so as to be able to make use of radio channel capacity. Due to this procedure, it is impossible to transmit periodic and constant amplitude signals, like the FSK modulation of Bell 103 coding in a secure way. For this reason, the panel's data communication goes through GSM data channel. Naturally, remote diagnostics operates with call back function too, at the expense of the Adapter's SIM card. If this function is necessary, then enable "**Enable BELL 103 callback**" option.

It is also possible to filter incoming data calls by phone number, which means the Adapter will accept incoming data calls only from the specified phone numbers. In this case data calls initiated from other phone numbers will be rejected.
To be able to program remotely alarm control panels with connected GSM Adapters, a GSM modem is necessary (T.E.L.L. GT64 recommended) on the caller side! The SIM cards placed in the modem and Adapter must support both way (send and receive data) GSM data call service (CSD).

3 External elements and functions of GSM Adapter Mini

3.1 SIM card case

The cover can be opened by pulling horizontally towards the LED display on its marked end. Insert the SIM card here and replace the cover after doing the following preparations:

Before starting to setup the Adapter, insert the SIM card into a mobile phone and perform the following settings:

- Make sure that the number of the SMS message centre is set correctly on the SIM card, that is SMS can be sent from the phone.
- Disable PIN code request on the SIM card so that it shall not prompt for a PIN code on turning the unit on
- Delete the unnecessary SMS messages from the card.

The SIM card necessary for the operation of the unit can be purchased from any GSM service provider.

**The Adapter is independent of GSM providers.**

3.2 LED signals

RED is continuously lit	Indicates that the module is powered up but not connected to the GSM network. (If it lasts longer than 30 seconds, check the SIM card and the antenna connection)
GREEN blinks slowly and impulsely	The module is connected to the GSM network is ready to communicate.
GREEN is continuously lit	Indicates that a call is in progress through the GSM network
RED and GREEN blink alternately	Indicates that the download process of parameters was unsuccessful. (e.g. download was interrupted) Download has to be repeated.

3.3 Antenna connection

The antenna must be fixed to the module's FME (pin) connector. The antenna in the package provides good transmission under normal reception circumstances. In case of occasionally occurring GSM signal strength problems or/and wave interference (fading), use another type of antenna or find a more suitable place for the Adapter.

3.4 Module wiring
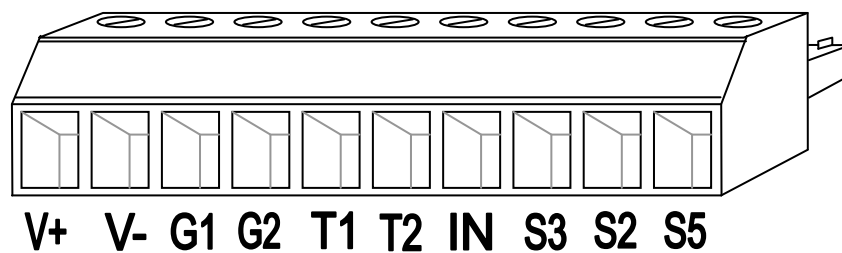
V+	Supply voltage 9-24V DC
V-	Supply voltage negative polarity (GND)
G1	Simulated line output from the GSM system (to the alarm panel's TIP input)
G2	Simulated line output from the GSM system (to the alarm panel's RING input)
T1	Landline (PSTN) input
T2	Landline (PSTN) input
IN	Direct GSM (to activate, connect to V-)
S3	Reserved
S2	Reserved
S5	Reserved

Attention! If the metal housing of the alarm control panel on which the antenna is mounted is connected to the protective ground then it is necessary to connect the protective ground to the GSM Adapter module's V- terminal as well.

3.5 Function of the "IN" (DIRECT GSM) input

Short-circuiting the **IN** input (to **V-** terminal), the module switches over to GSM transmission, i.e. irrespective of the existence of an analogue phone line, the Adapter initiates the call through the GSM network. Apart from this, it blocks and rejects incoming calls to the Adapter. This ensures the call transmission in case there is some fault in the telephone system or subsystem, i.e. if the PSTN line seemingly works but the alarm system cannot connect to the monitoring station through the PSTN network. Most alarm systems can be programmed activate a PGM output after a certain number of unsuccessful dialing attempts. If this PGM signal arrives to the IN1 input of the Adapter, i.e. the PSTN cannot be used, the unit will initiate the next call through the GSM network.

4   Setting the alarm control panel

Check the following settings on the alarms system:
- **The reporting format must be set to "CONTACT ID" or "ADEMCO Express".**
- **The phone numbers of the monitoring station must be specified containing the area codes as well, so that they can be called from the SIM card through the GSM network**
- **Set the dialing to TONE mode**

4.1   Further notes

- The Adapter does not know in advance the length of the phone number to be dialled, therefore do not wait too long before entering the next digit, because if you do so the module might suppose that the dialling has already finished. (The Adapter expects at least 7 digits, and does not start dialling until they are entered. It starts calling a number of 7 and 10 digits after a 5 second pause. In case of 11 or more digits, the Adapter starts dialling after a 2 second pause). This does not cause problems for alarm control panels due to fast and automatic dial but needs attention on manual dialling.
- Telephone numbers shorter than 7 digits can be dialled by entering # after the number.

5   Installation guide

Before installation verify the future environment of the Adapter:

- Check the GSM signal strength using your mobile phone. It may happen that the signal strength is not sufficient in the desired installation place. In this case you have possibility to change the planned installation place before mounting.
- Do not mount the unit in places where it can be affected by strong electromagnetic disturbances (e.g. near electric motors, etc.).
- Do not mount the unit in wet places or places with high degree of humidity.

5.1   Mounting

Suggested installation method: the GSM Adapter should be placed into the same metal housing as the alarm control panel. Drill a hole on the metal housing for the FME connector. Choose the drill size appropriate for the FME base part. Fix the FME base with the enclosed screw nuts into the housing. Ensure that the FME base and the metal housing has galvanic connection.
In case of plastic housing or weak GSM signal strength it may be necessary to use another (directed) type of antenna.

Attention! If the metal housing of the alarm control panel on which the antenna is mounted is connected to the protective ground then it is necessary to connect the protective ground to the GSM Adapter module's V- terminal as well.

5.2   Putting into operation

- Make sure the SIM card is placed into the module properly.
- **Enable the caller identification service on the SIM card at the GSM service provider** (a few types of SIM cards do not have this function enabled by default).
- Make sure the antenna is fixed properly in the Adapter.
- Make sure the wiring is done as earlier instructed.
- The device can be powered up (9-24 VDC). Make sure that power supply is sufficient at the load of both the alarm control panel and the Adapter. The quiescent current of the Adapter is 200mA, however it can reach up to 500mA during communication.

6   Technical details

6.1   Technical specification

Supply voltage:	9-24 VDC
Maximum current consumption:	500mA
Operating temperature:	-20ºC — +70ºC
Transmission frequency:	GSM 900/1800 MHz, 850/1900 MHz
GSM phone type:	Simcom SIM340
Dimensions:	84x72x32 mm
Net weight:	200g
Gross weight (packed):	300g

6.2   Generated telephone line specification

Line voltage:	48 V
Line current:	25 mA
Line impedance:	600 Ohm
Ringing voltage:	±72V (25 Hz)
Dial tone:	400 Hz

6.3   Content of the package

- GSM Adapter *Mini* + terminal connector
- GSM 900 MHz / 1800 MHz antenna
- User manual, warranty card
- CD
- USB A-B cable

6.4   The manufacturer's contact

T.E.L.L. Software Hungária Kft
4034 Debrecen, Vágóhíd u. 2.
Hungary
Tel.: +36-52-530-130
Fax.: +36-52-530-131
Web: www.tell.hu

7   Example of application

Demand:
- Connecting the alarm control panel to monitoring station
- Information on balance to the owner about the prepay card (Tel: +36-30-123-4567)
- SMS to the owner about burglar alarm (Tel: +36-30-123-4567)

Start the "GSM_Adapter_Remoter_vxxx.exe" application, main steps:

1. **Connect the module to the PC through USB**
   (When connection is established a green tick icon appears in the upper right corner of the program window and module version is displayed in the program header)
2. Select **"Parameter settings"** menu
3. Set the demanded parameters:
   on "**Phone numbers**" page -> User 1.:   **0036301234567**
                                    SMS forward Nr. 1.:**0036301234567**
   on "**SMS settings**" page   ->   event code: *1130*   SMS message: *ALARM $*
4. Press "**Write parameters to module**" button
5. **Disconnect from USB**