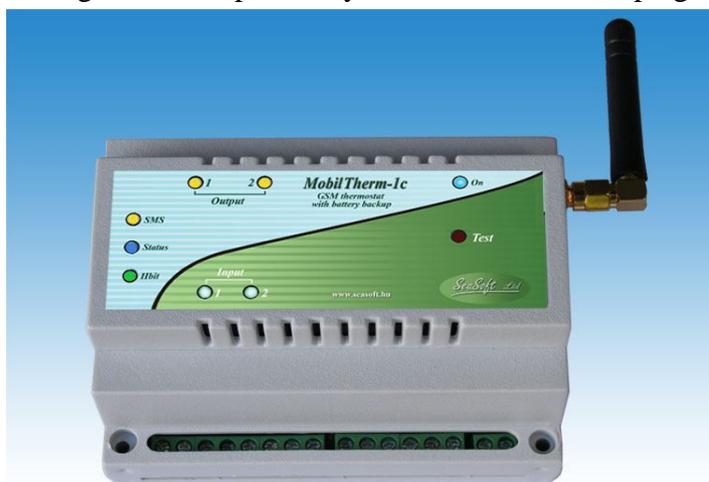


The *MobilTherm-1c* is a GSM thermostat and remote signaling module, designed for GSM based remote control, remote signal and temperature regulation. It comes with an external *digital thermometer, 2 inputs* that can be activated by *8-30V* dc voltage and 2 single circuit high current *relay outputs* with NO and NC contactors. Output relay no. #1 is switched on/off via SMS messages in bistable mode (changes only by another SMS), the second output can be configured via SMS for a given time to be switched on, so that it will automatically switch off after the configured time expires. A small digital thermometer that can be connected to the module and it works in the temperature range of *-50C and +50C*. The module keeps the temperature within the previously set limit in either heating or cooling mode according to the temperatures configured by the user. The module will automatically send an SMS to the user's configured phone numbers when the temperature exceeds the configured minimum or maximum threshold. The user is informed about the temperature alert either via an SMS alert with user defined preset text or an automated call by the module. Auxiliary relay no. #1 is off by its default state and it can be switched on and off with a configuration command. Relay no. #2 is also off in its initial state, and can be switched on for a previously configured, user defined time by an SMS command. When the configured time elapses, the relay will automatically switch off to its normal state. The module can be configured to handle maximum of *8 telephone numbers*. It can be used as stand-alone units for heating and cooling systems replacing mechanical thermostats for both industrial and domestic use, therefore it is suitable for cooling storages, air-conditioned rooms, warehouses and temperature regulated agricultural or livestock breeding rooms. The power supply voltage range of the module is *10-30V* dc. It can be configured with our *free software* (which can be downloaded from our website) via an *USB* port or by the SMS messages sent to the module. The auxiliary inputs and outputs can be *labeled* by max. 16 characters. The controller SMS commands to control the relays can also be configured by the user. The module has its own *4-character ID* which prevents unauthorized person from disabling or reconfiguring it. The module has internal timers, which can turn off the relay no. #2 after a previously set time and after this interval expires, it resets to its original state.

1. How the interface works:

The *MobilTherm-1c* can regulate the desired unit according to the configured heating or cooling mode independently from other units, keeping the temperature at the configured level in the



given range. It works with a stand-alone SIM card, either pre-paid or subscription type from any provider. All configured parameters and the current state of all inputs and outputs can be queried and checked after connecting to a GSM network. The device confirms every command by sending back an acknowledge SMS. Do not send new commands until the acknowledge SMS has not been received. All of the configurations, including names of the inputs, state of the outputs and the configured values etc. are

retained in the unit after being switched off. When proper voltage is restored, the unit will continue working according to the user configured values. The system frequently queries the GSM network, therefore in the case of a network problem or weak network restart and log back to the network,

restore the thermostat and continue functioning properly. The integrated Li-polymer backup battery can be provided for the unit optionally, so that it can send reports about power loss and restoration of the 230V network. A TEST button can be found at the top of the module. The simplest module can be purchased as a complete system with industrial GSM module with the most recent software; with aerial as *MobilTherm-1* panel version; with black metal enclosure as *MobilTherm-1d*; with black metal enclosure with inner backup battery as *MobilTherm-1ad* or as *MobilTherm-1c* in plastic enclosure that can be clipped to a “C” rail, or called “DIN” rail also with backup battery.

2. Explanation status of LEDs on top side

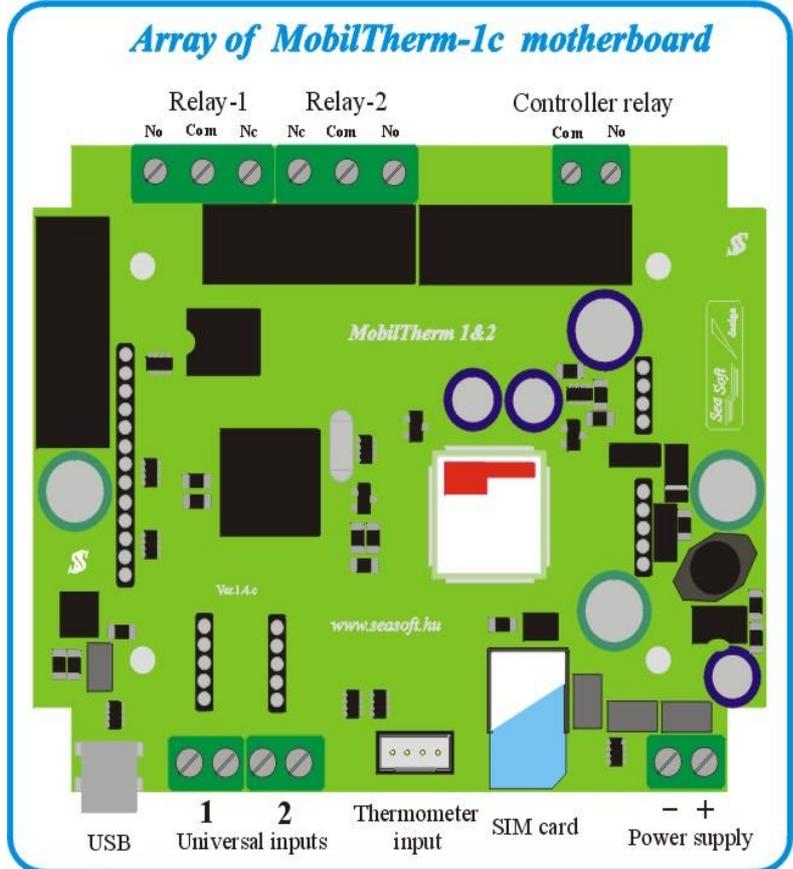
The colorful LEDs located beneath the front cover indicate the status of the device. The lower, bi-color LED labeled as “Hbit” can express statuses and messages explained below, and the upper, yellow LED labeled as “SMS” indicates the SMS and voice:

Green Hbit LED states:	
Off	The life-signal of interface electronics. It switches off after powering up and it only starts to blink in when the module is connected to a network. If the LED not blinking at all, the module is not able to operate: <ul style="list-style-type: none"> - the GSM module cannot find network, or - the signal strength is not enough for operation, or - faulty antenna, or - SIM card error, or the SIM card is not entitled for voice calls, or - SIM card is locked with PIN code
Blinking green	Blinking when the module is connected to a network. This is its normal operation.
Bi-color LED states:	
Blinking green:	when the unit operates in cooling mode, and the current temperature is within the given range. When the control relay is switched on, the led will lit for longer periods and fades for short period. When the controller relay is off, it blinks with higher frequency.
Blinking yellow:	When it operates in heating mode and the current temperature is within the given range, the led blinks in yellow for longer periods when the relay is switched on, and it is turned on for shorter periods when the relay is off.
Blinking red:	<ul style="list-style-type: none"> - For both heating and cooling mode, when the current temperature exceeds the alarm threshold, the led will blink in red in all cases. - In the case there is no connection between the module and the thermometer or the sensor is broken, it will also blink in red.
Yellow LED (SMS) states:	
Continuously yellow:	It is turned on when the device communicates via GSM. The module is either sending, receiving SMS-s or the user is calling the device.
White LEDs (inputs) states:	
Continuously white:	The common input is active (pulled to ground); or comparator is in high status; voltage on optocoupler type input or AC voltage above 3Vac on AC type input
Yellow LED (common relay output) states:	
Continuously yellow:	The common relay output is active, the relay is on
Blue LED (regulate) states:	
Continuously blue:	The heating/cooling output is active, the controller relay is on

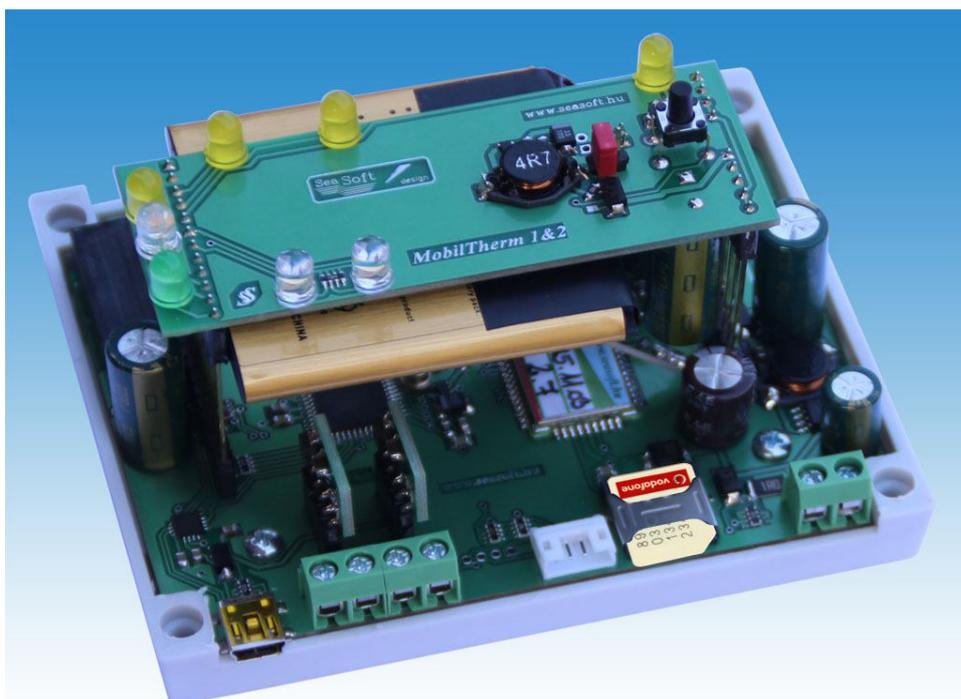
3. Module wiring and connectivity:

The supply connection require **10-30V**. The inputs can be switched on by **0V** current (pull to ground). The numbering of analog and digital inputs has been indicated on the printed circuit board. The output relays are single circuit and high current relays. Their maximum rating is **6 A** at **230 Vac**.

The high current relays' COM (common), NO and NC (normally open or closed state) connectors also have been wired out. The module has SMA aerial connection, which can be found on the upper side of the module. Magnetic and small straight aerial can also be connected. The **MobilTherm-1c** thermostat has high opto-isolated inputs, so they are highly protected against overvoltage. The different auxiliary devices can be connected to inputs of **MobilTherm** thermostat are recommended to be solid, relays, switches, reed-relays, contactors or any metal contacts. In addition, they must have low resistance and prell protection. The supply input is protected against reverse polarity and a fuse also has been installed into the device. It can be configured via **USB-port**, and the configuration settings can be down-

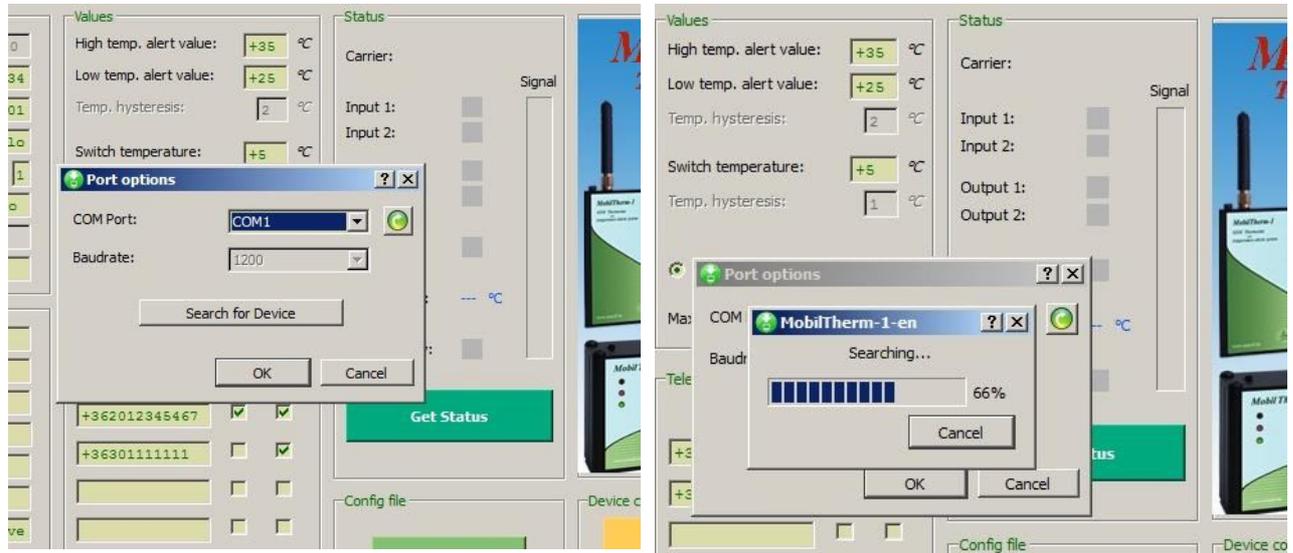


loaded or even read for verification purposes. The digital thermometer modules can be connected to the panel by coaxial screened wires. The digital thermometer is operational between **-50C to +50C** and it has **+/- 0.5** precision within this scale. Their default cable length is 60cm, but they can be ordered with cable up to **6m**.

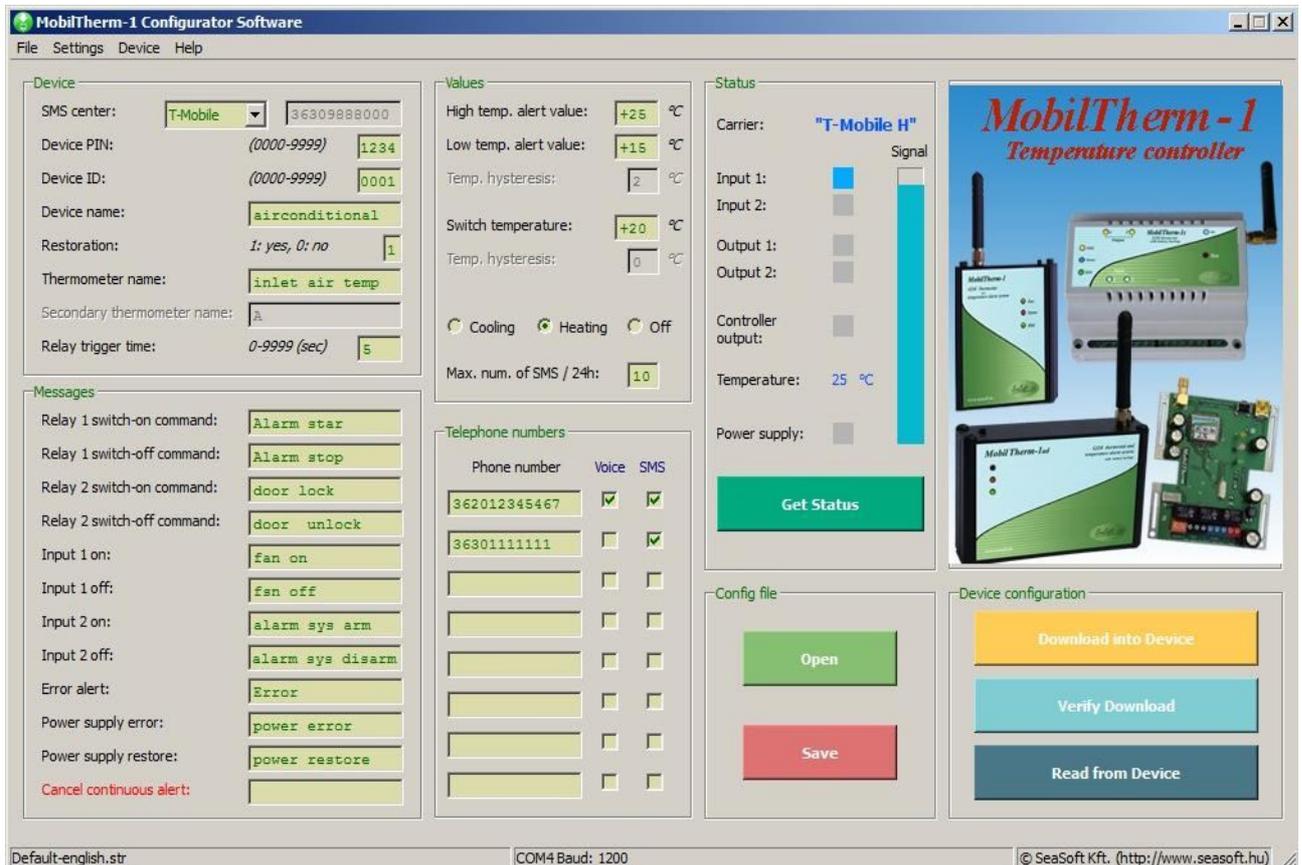


4. Programming the *MobilTherm-1c* from a computer:

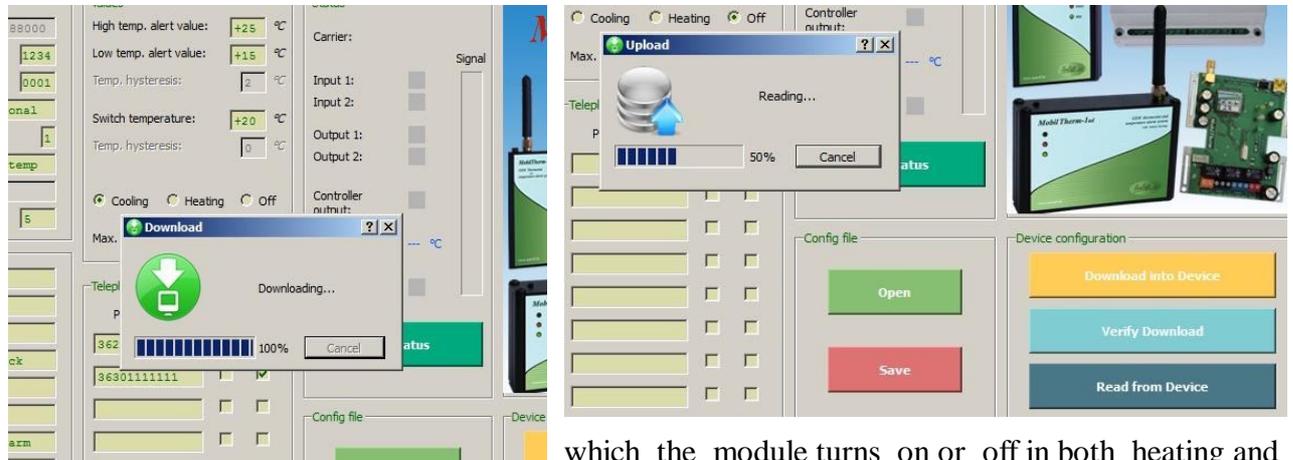
The *MobilTherm-1c* GSM thermostat module can be configured from computer via **USB**-port by using our free software. First step after connecting the powered up device to the USB port is to install the modul driver to be recognized by **Windows XP**, **Windows-7** or **Windows-8** operating system. In the case that the driver is already installed but the operating system still cannot recognize the device, the operating **Win** system settings should be modified in that particular order as described in the appendix. The software can configure all members of the *MobilTherm-1* family. After connecting the device, launching the software and pressing the **Search for Device** button, the



software will automatically search and recognize the connected device. After successful recognition, the corresponding picture of the device will be displayed in the main window of the software. The status of the device can be queried by pressing the **Get Status** button if the device is connected to a network. After connecting the device and querying its status, the screen is represented as follows:



All the important fields on the screen have to be filled. The only optional setting is the adding of 8 telephone numbers. To configure which numbers receive SMS notice from the desired input change, use the checkboxes next to the phone numbers. It can be configured which phone number should control the selected output when dialed. It is important to fill the fields correctly and not using accented characters. Configuration data can be uploaded from the module. The data can be displayed and checked if the data was changed by using SMS since the last download. The procedure of data download and read up can be initiated in the **Device menu**. Status of downloading and reading is displayed in a pop-up window. The **Switch temperature** module indicates the temperature at



which the module turns on or off in both heating and cooling modes. It is important set reasonable configuration for temperature limits, alarm levels in order to avoid too much unnecessary alarms, and it is important to configure the maximum number of sent SMS-s in a day, thus the user can avoid great expenses in case of wrong configuration. The current status of the connected device including the inputs, the outputs, the control outputs, the current temperature, the power voltage, the current network coverage of the provider and the industrial GSM modem can be displayed by using the status update button.

5. Configuring *MobilTherm-1c* by SMS using commands:

The *MobilTherm-1* GSM thermostat confirms every command by sending back an acknowledge SMS. Do not send new commands until the acknowledge SMS has been received, because the SMS will be lost and will not be processed. The acknowledge SMS reflects the changed parameter and the actual status of the outputs and inputs. If the command is invalid, the module cannot interpret it and the acknowledge SMS will contain '**Error**'. When switching on the device, the inputs are checked and the device takes it as an initial state. Changes from this initial state will cause alarm, and the new input status will be sent via SMS. Specify the number of the SMS Center first during configuration, or else the device will not respond to the configuration commands and will not operate properly.

Memory write or modification commands : (W = write)

e.g. **!1234,W00,36309888000** where **1234** is the device PIN code
W00 memory place of provider's SMS short message center
36309888000 number of provider's message center in international format (here hungarian T-Mobil)

e.g. **!1234,W01,5678** where **1234** is the old device PIN code
W01 memory place of device PIN code
5678 is the old PIN code

e.g. **!1234,W10,lamp on**

where **1234** is the old device PIN code

W10 memory location of command to switch on relay no. 2

lamp on where **lamp on** is the message which has to be sent by the device in case of switching relay 2 out

<i>Memory map of MobilTherm-1 thermostat</i>			
Memory loc.	Function of memory	Remarks	Factory settings
00	Sms call center	International format	- - -
01	Device PIN code	4 digit	1234
02	Device identifier	4 digit	0001
03	Device name	Max. 16 characters	Weekend house
04	Restore report (in case of input restore)	0=no, 1=yes	1
05	Name of thermometer	Max. 16 characters	temp in house
06	Not used	-	-
07	Relay trigger time	From 0 to .9999 sec	5
08	Relay 1 – Switch ON command	Max. 16 characters	boiler on
09	Relay 1 – Switch OFF command	Max. 16 characters	boiler off
10	Relay 2 – Switch ON command	Max. 16 characters	light on
11	Relay 2 – Switch OFF command	Max. 16 characters	light off
12	Input 1 - “switch on” message	Max. 16 characters	alarm start
13	Input 1 - “switch off” message	Max. 16 characters	alarm stop
14	Input 2 - “switch on” message	Max. 16 characters	door chime on
15	Input 2 - “switch off” message	Max. 16 characters	door chime off
16	Thermometer 1 – low temperature alarm	Celsius degrees, signed	+15
17	Thermometer 1 – high temperature alarm	Celsius degrees, signed	+25
18	Not used	-	-
19	Desired temperature	Celsius degrees, signed	+22
20	Mode (Heating or cooling)	+ heat, - cool, 0 off.	0
21	Not used	-	-
22	Error message text	Max. 16 characters	Error !
23	Power error message text	Max. 16 characters	power error
24	Power restore message text	Max. 16 characters	power restore
25	Maximal number of SMS in 24 hours	0...99	10
26	1st phone number	International format	36201111111
27	2nd phone number	International format	----
28	3rd phone number	International format	----
29	4th phone number	International format	----
30	5th phone number	International format	----
31	6th phone number	International format	----
32	7th phone number	International format	----
33	8th phone number	International format	----
34	“Stop the alarm” command text SMS	Max. 16 characters	----

Memory read-query commands: (R = read)

e.g.. **!1234,R00** response: (memory status) **0001**
Weekend house
M00: 36309888000 (the number of the provider's SMS message center is queried)

e.g.: **!1234,R** response: (global status) **0001**
Weekend house
aux. temperature: +12C
indoor temperature: +20C
alarm stop
door chime off

Output setting commands: (E = execute)

e.g. **!1234,E,fan on** where **Boiler on** command is the command on **08** memory place, which (according to the table) is the **1. Relay switch on command**. Accordingly, the no. 1 Relay will turn on.
response: **0001**
Weekend house
Boiler on

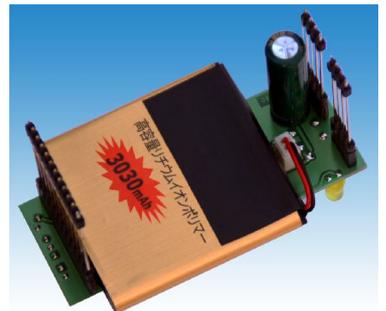
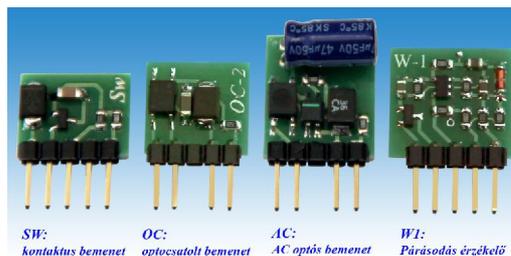
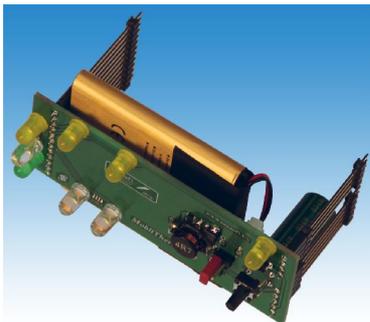
e.g. **!1234,E,door lock** where **door lock** command is the command on **10** memory place, (according to the table) is the 2. Relay switch on command. Accordingly, the no. 2 Relay will turn on for the configured
response: **0001**
Weekend house
Light on
5 min

e.g. **!1234,E,+** where **+** means that **MobilTherm-1** thermostat came to be in **heating** mode, and starts to regulate the connected heater device

e.g. **!1234,E,0** where **0** means that **MobilTherm-1** thermostat came to be **passive** mode, stop to regulate any connected device

e.g. **!1234,E,OK** The content of memory place 34 is executed, the alarm and SMS sending is terminated and next phone numbers **will not receive** further notification (in case of having something in memory #34)

- Attention!**
- If the content of **memory place 34** is not empty, the module will call the configured phone numbers **continuously** until someone sends an SMS as an acknowledgement with the same content !
 - If the content of memory place 34 is empty, the call alarm **will be sent** to each number **only once** !



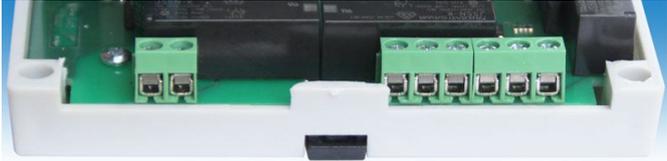
Activating or deactivating the configured phone numbers:

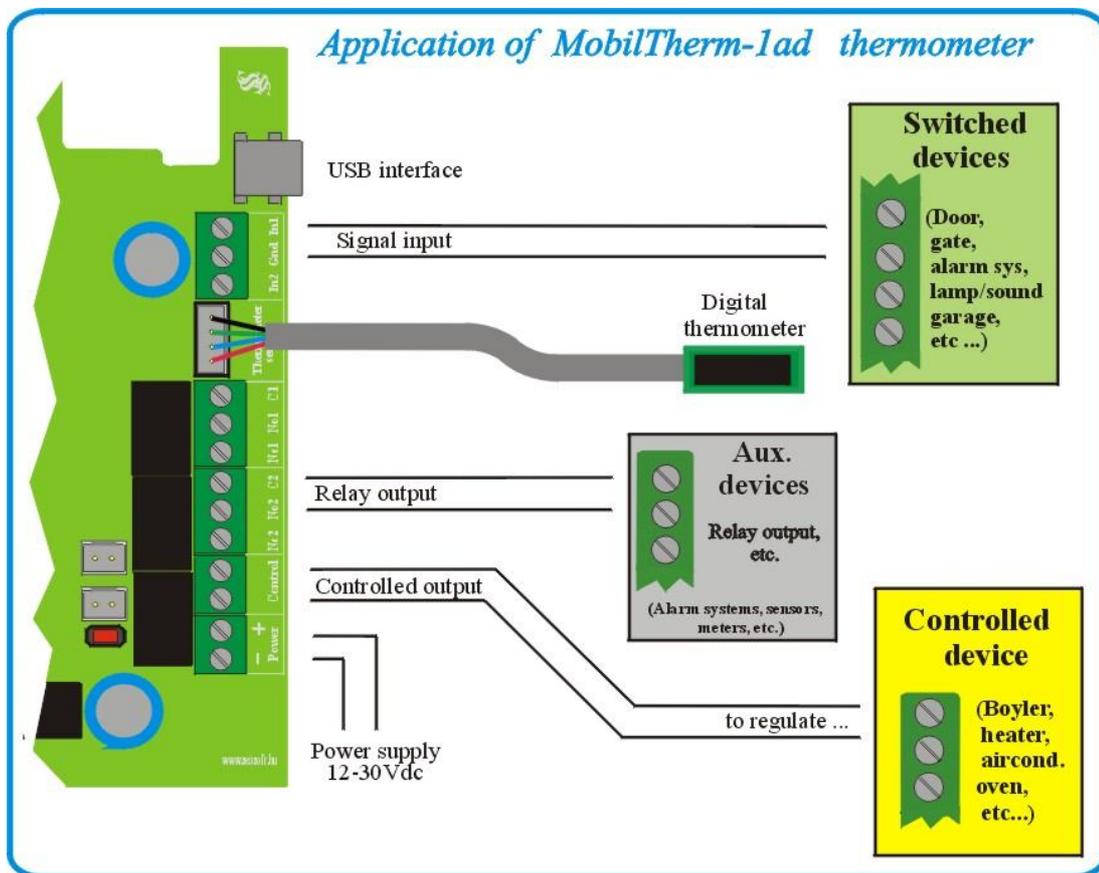
The configured phone numbers have an argument which indicates the operation that is to be performed after an alarm occurred:

- | | |
|--------------------|---|
| P = Passive | the device <i>does not notify</i> this number |
| S = SMS | in case of alarm the device <i>notifies</i> this number <i>only via SMS</i> . |
| D = Dial | dial in case of <i>alarm</i> the device only <i>rings this number</i> . |
| A = Active | in case of alarm the device <i>rings</i> and <i>sends</i> an <i>SMS</i> to this number. |
- e.g. **!1234,A** the sent phone number (where the SMS is sent from) *becomes active*, which means that in case of alarm this number will be ringed and it will get an SMS too
- e.g. **!1234,P** the sent phone number (where the SMS is sent from) *becomes passive*, which means that in case of alarm this number neither be called nor receive an SMS
- e.g. **!1234,S,36201234567** this phone number will only get an *SMS in case of alarm*.
- e.g. **!1234,D,36309876541** this phone number *will only be ringed* in case of alarm.
- e.g. **!1234,P,36201234567** the configuration of this number changes and it *will not* receive *calls* or *SMS*.

6. Installation guide:

During *MobilTherm-1* installation, the tasks are advised to be performed in the following order:

- 1** The SIM PIN must be disabled on the SIM card, then it is advised to put the SIM card in a regular mobile phone to check if the SIM card is allowed to send SMS-s. Newly bought SIM cards has to be checked whether it can send SMS-s. (Sometimes the initial balance of specific SIM cards can be only used for voice calls. In this case the card has to be topped-up by the user to be able to send SMS-s.) Considering pre-paid SIM cards, showing the caller ID feature must be enabled through customer service. Setting or checking the state of this feature cannot be performed with a regular mobile phone.
- 2** After programming the device, the SIM card should be inserted into the SIM holder as shown in the figure. The SIM holder is located on the front of the device.
- 3** The power supply must be connected with correct polarity. After powering on, the device should be waited for registering to a GSM network. This is indicated with green-colored blinking of the LED
- 4** The configurator software can be installed from the CD or can be downloaded from <http://www.seasoft.hu> webpage. First the device driver must be installed. It is advised to restart the computer after driver installation.
- 5** After restart, connect device to the PC or laptop via USB, then launch the configurator software.
- 6** After launching the software, the device is recognized by selecting the appropriate virtual COM port. This can be done either automatically or manually. After filling the input fields, the configuration must be downloaded into the device. It is advised to query the status of the device after configuration to check the signal strength, input and output states. By obtaining valid signal strength and carrier info, it means that the device could successfully connect to a GSM network.
- 7** After downloading the configuration, the device should be disconnected from the PC or laptop, then it has to be disconnected from the internal battery and external power supply.
- 8** Then re-connect the power source and power on the device, and all functions must be checked. After configuration, further resetting the device will retain the configuration data.



7. Other facts:

Regarding to the device functionality, GSM networks and the specialty of GSM voice calls and SMS-s, the module requires further remarks:

- a) The device can be operated with any microSIM card
- b) The received unknown SMS-s, including the ones sent from the carrier (including the balance check SMS) are forwarded to the first telephone number, if the first telephone number is specified in the configuration.
- c) If a pre-paid SIM card is used and the balance reaches zero, the device can remain operational however it cannot send further SMS-s or initiate calls. In this case it is advised to regularly check the balance of the card.
- d) After downloading a configuration from PC via USB, the device will restart which takes 30-40 seconds, and it will be operational after registering to a GSM network.
- e) All members of the *MobilTherm* family can operate only with SIM cards that are not protected with PIN codes. Please note that the SIM PIN is not equal to the module PIN number.
- f) Before device use, the PIN code has to be removed from the SIM card.
- g) By using pre-paid SIM card, showing the caller ID must be enabled. This can be performed by contacting the carrier's customer service.
- h) Call-forwarding and SMS reminders about missed calls sent by the carrier must be disabled on the SIM card.

In the case the operating system does not recognize the connected device after driver installation, please check the system settings according to the following appendix !

8. Specifications:

Power supply:	10–30 Vdc	GSM:	Dual band
Max. Current:	240 mA	Frequency:	900/1800MHz
Stdby current (relays on):	120 mA	Communication:	SMS, voice
Stdby current (relays off):	30 mA	Aerial conn.:	SMA
No. of aux. inputs:	2 pcs	Enclosure:	DIN rail enclosure
No. of aux. outputs:	2 pcs	Dimensions:	107 mm x 90 mm x 66 mm
Measuring themerature:	-50...+50 C	Operating temperature	-30 - +70 C
Accuracy:	0.5 C		

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