IMKO
MICROMODULTECHNIK GMBH

PRECISE MOISTURE MEASUREMENT

Datalogger globeLog®

User Manual

IMKO
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Thank you for buying our globeLog® datalogger. The globeLog® represents the state of the art in datalogger technology.

Please read the operating instructions carefully to ensure that you obtain optimum results with your globeLog®. If you have any queries or suggestions concerning your new globeLog®, please don't hesitate to contact our registered dealer or IMKO directly. We will be glad to help you.

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Operating Instructions for globeLog® Datalogger

status March 2009

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1 Description / Interfaces

Your globeLog has 4 IMP-Bus ports:

- IMP-Bus 1-3: With Power Management
- IMP-Bus 4: With a permanent power supply (e.g.: for wind sensors)

The other side of the casing has ports for the power supply (e.g.: for solar panels, batteries, or mains power) and the RS-232 port for communication with the aid of the globeLog Control Software (available at http://www.imko.de).

Surge-diverter connection (earthing!) Connect a Kreuzerder (grounding rod) or earthing strip here using a green/yellow earth wire (minimum diameter 6 mm²). Ensure that the connection is secured by means of stainless steel (V2A) screws, nuts etc.

Connector (N-Connector!) for a GPRS antenna for units with a remote data transmission option.

1. 2.5 Amp fuse
2. LED: Bus power supply
3. LED: Logger activity
4. LED: globeLog power supply
5. LED: Data reception via IMP-Bus
6. LED: Data transmission via IMP-Bus

2 Overview

Your globeLog has the following memory:

- Data memory ("**Flash"**), 2 MB (for upto approximately 400,000 readings).

The **Flash** memory has a large memory capacity which, from the point of view of the user, is the most important feature: it contains all the retrieved readings.

Your globeLog has been built and designed with the basic principles of reliability and stability in mind. This is partly reflected in the fact that all the memory areas are designed in such a way that your readings cannot be lost even in the case of a sudden loss of power. As soon as the power supply is restored to your logger it will resume operation operation without any loss of data and without having to be reconfigured.

Another basic principle behind your globeLog is the integrity of the stored readings. Volatile data memories are very sensitive to external influences such as radiation, lightning strikes, moisture, and interference peaks. This is why we have kept this memory area as small as possible. In "sleep" mode only the RTC uses a small volatile memory area as a counter. The RTC is constructed so as to ensure that if data is lost it will resume operation automatically within a maximum of a few hours. The RTC has a small independent battery that supplies enough power for a few years.

Years of experience and testing have gone into the technology and components used to construct your globeLog, which makes this device a very reliable feature of your sensor network, even in the most extreme conditions. Compared with a modern computer, your globeLog has an unbelievably little memory but is still capable of performing complex calculations, managing its power supply very efficiently, and even controlling a GPRS modem for the purposes of allowing a totally wireless transmission of the measurement data. In addition to this it also monitors its functions continuously by means of processes that run in the background (so-called "Watchdogs") to ensure the safety of the readings under all circumstances.

In order to make your globeLog as robust as possible, however, we have had to forfeit a certain degree of technical sophistication. For example, your logger cannot process several tasks simultaneously. Your logger is a so-called "single-task system", in other words this means that the user might find that from time to time the logger might appear to not respond immediately when running the globeLog Control software. If this occurs, simply wait a moment and then try again.

3 Installing the GPRS SIMcard

1. Open the SIM card slot by applying slight pressure to the lower end.

2. Insert the SIM card into the card slot.

3. Close the card slot again by applying slight pressure.

4 Summary

globeLog Control is a software interface for your globeLog. It enables the globeLog to be configured and the stored data to be retrieved.

4.1 Requirements

globeLog Control has been tested and runs on Microsoft Windows 98 SE, Microsoft Windows XP, and Microsoft Windows VISTA operating systems. An RS232 interface is required for connecting the globeLog directly to a PC. If your computer does not have such an interface, you will need an additional USB<->RS232 adapter. This type of adapter is available from IMKO as an optional extra.

4.2 Installation instructions

The latest version of globeLog Control can be downloaded free of charge from our website at any time. The software can be found under the following link:

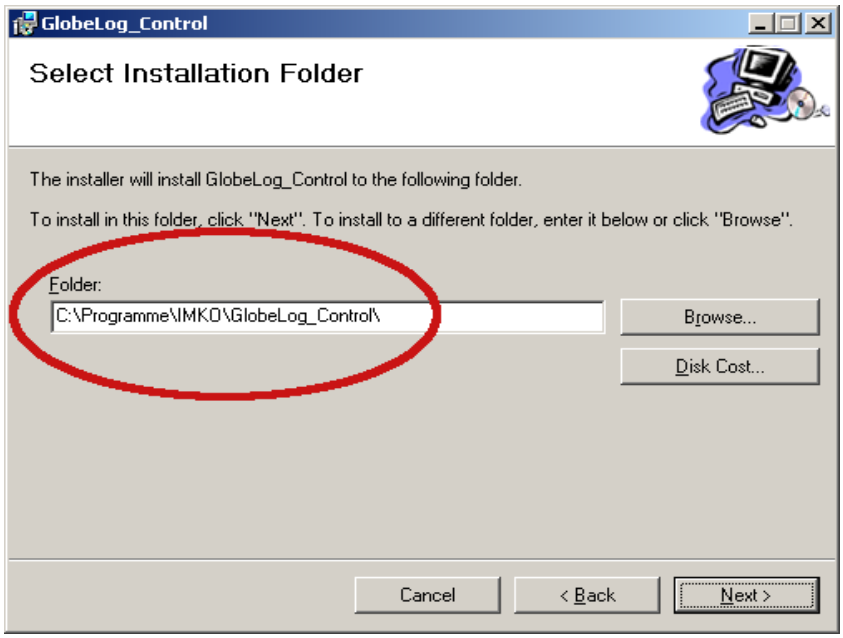
http://www.imko.de/DE/globelog

Note: If you have purchased a preconfigured globeLog system, please use the enclosed version of the software.

The installation of globeLog Control is launched by double-clicking on the installation archive e.g.: globelog_v2.03.exe. Before beginning the installation process, please ensure that you have adequate user rights on the target system. If in doubt, please contact your system administrator. We recommend installing globeLog Control in the following directory:

C:\Programme\IMKO\globeLog_Control\

Note: If you use a USB<->RS232 adapter, please refer to the documentation supplied by the manufacturer for installing the necessary drivers.

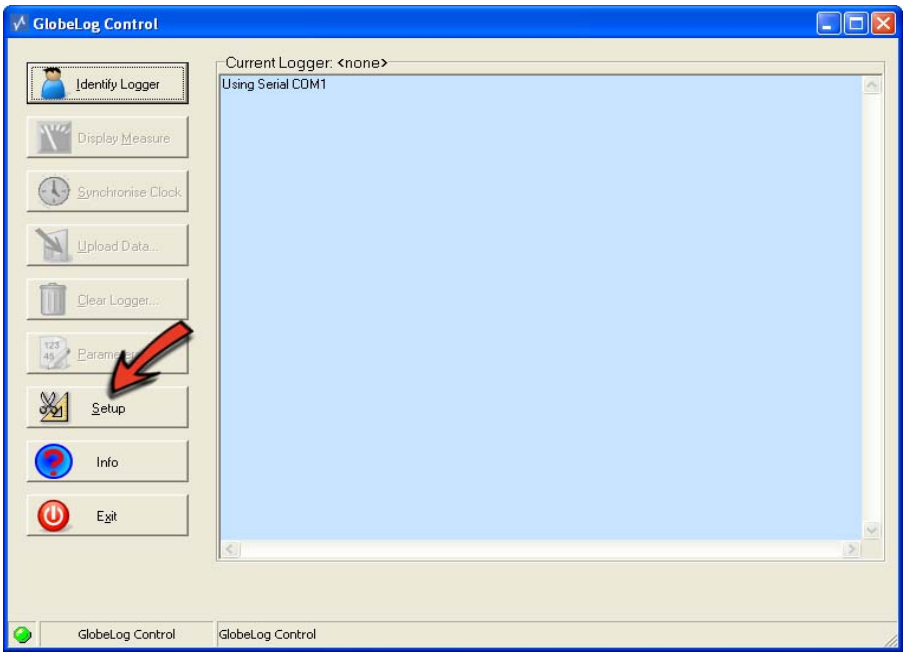


4.2.1 Brief “step by step” configuration instructions

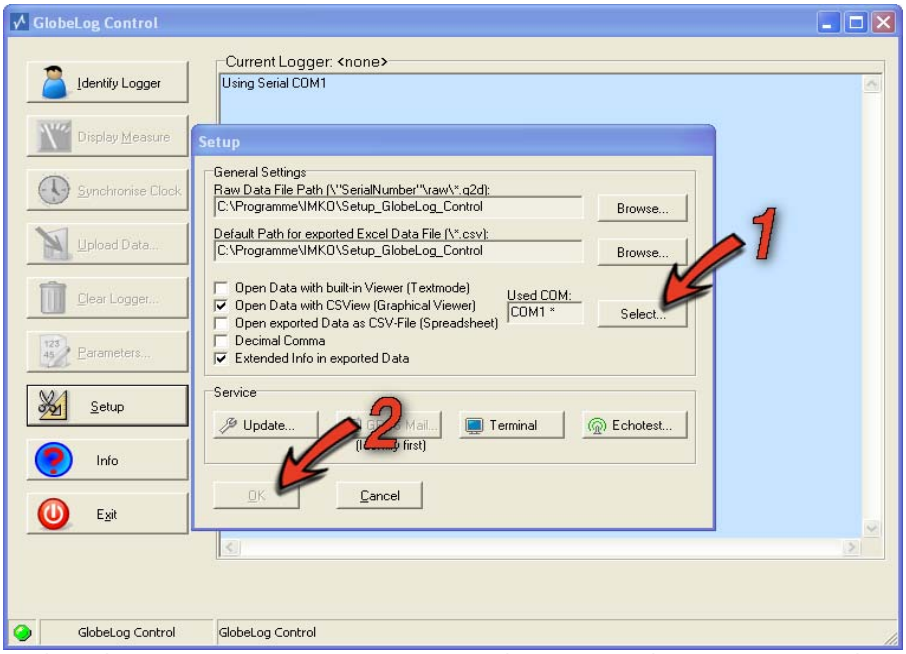
1. Once installation has been completed, please launch globeLog Control by double-clicking

on the appropriate desktop icon.

The following window appears:

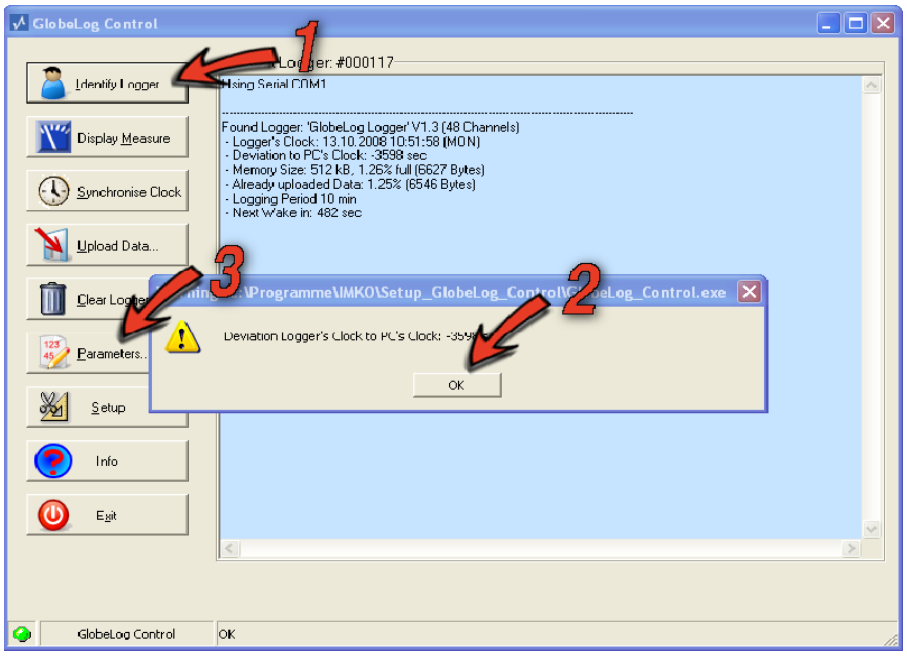


1. Click on the "Setup" button to open the settings dialogue. The following window appears:

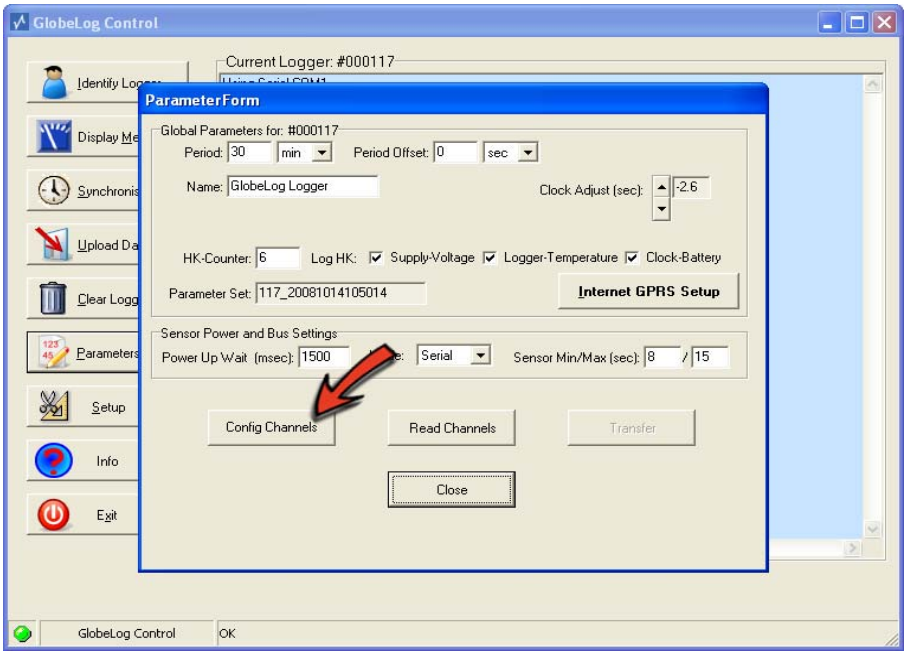


2. Here, select the computer's COM port you wish to use or the USB-RS232 adapter by clicking on the "Select" button (1). Close the setup dialogue using the "OK" button (2). If you have purchased a preconfigured globeLog System you can skip the following steps and continue

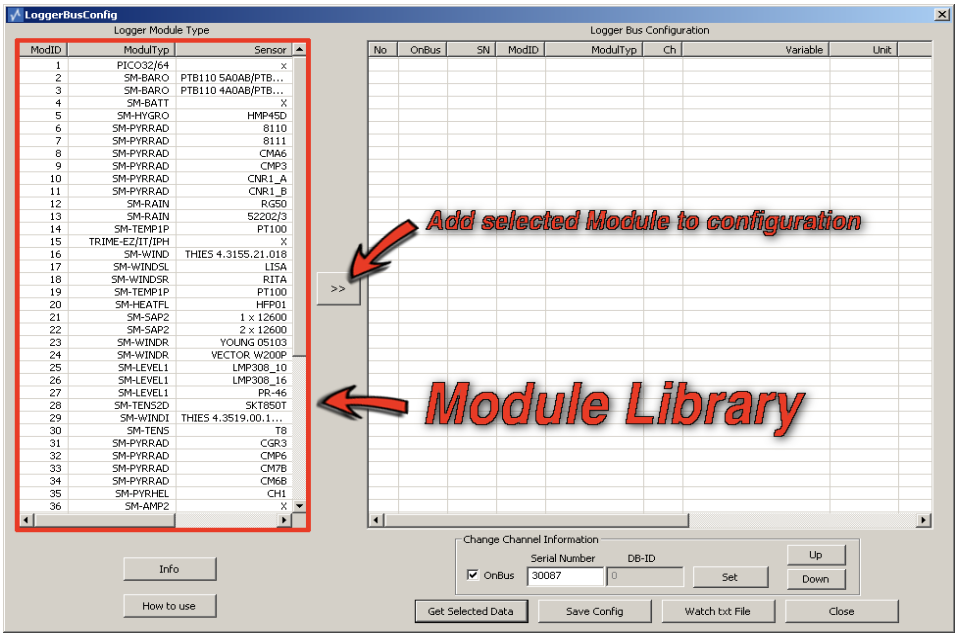
with the test measurement at item **11.**



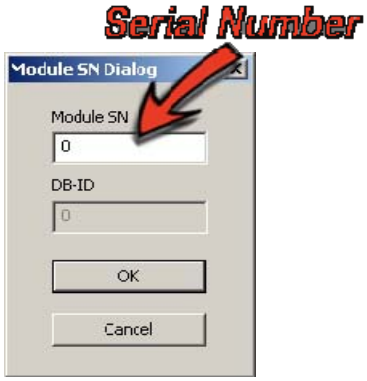
3. Next, identify the globeLog using the "Identify Logger" button (1). Ignore the warning that might appear about the time difference between PC and logger clock and acknowledge by the dialogue by clicking on the "OK" button (2). Now open the settings dialogue for the measurement parameters using the "Parameters..." button (3). The following window appears:



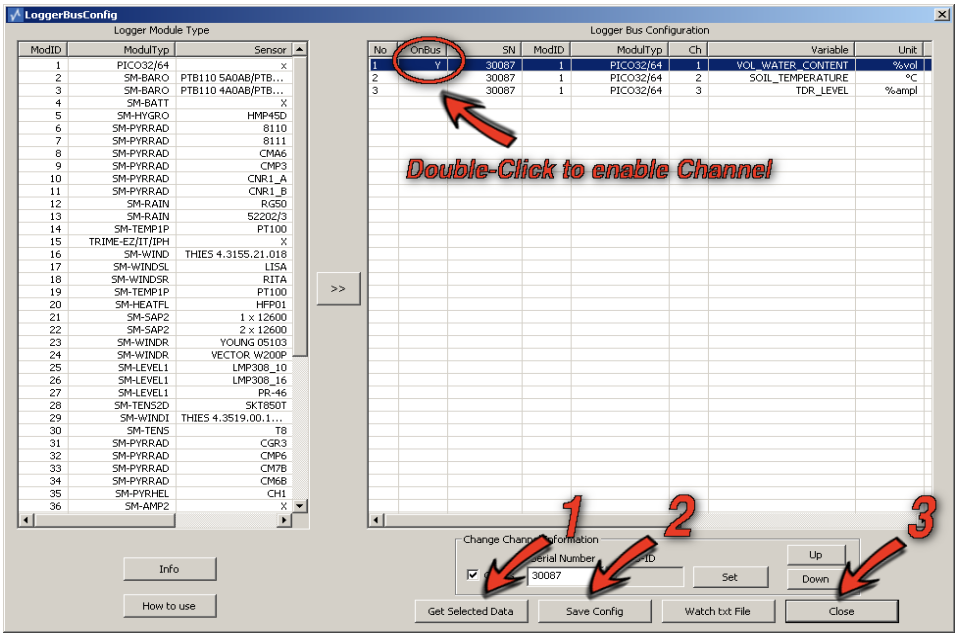
4. Open the dialogue for selecting the connected modules using the "Config Channels" button. The following window appears:



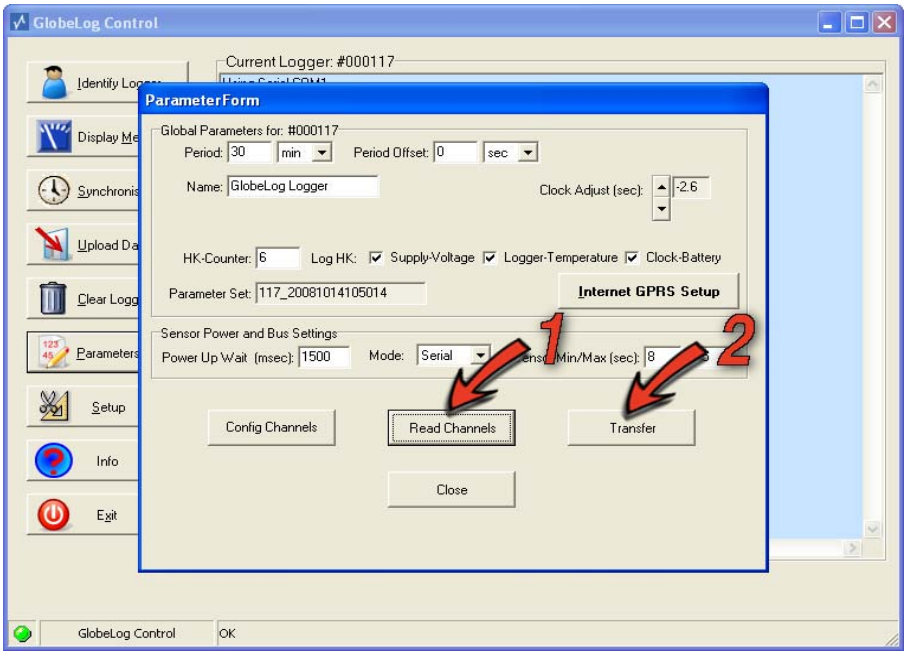
5. From a predefined library on the lefthand side of the window above, you can select the modules connected to your globeLog and add them to your globeLog configuration with the aid of the ">>" button. The following dialogue appears for every module that you add in this way:



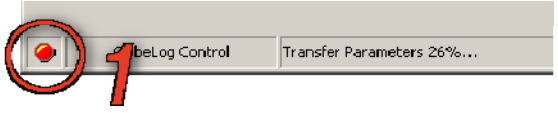
6. Here, enter the serial number of the respective module until you have added all the modules connected to the globeLog.



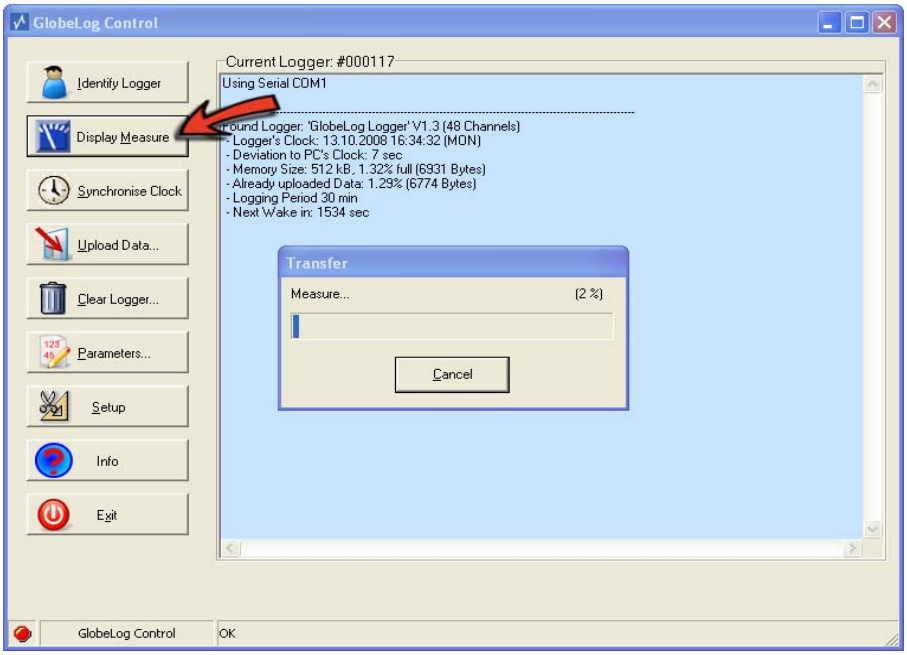
7. Now, by double-clicking, you can select the module channels to be measured. Then refresh your configuration using the "Get Selected Data" button (1), save your configuration with the "Save Config" button (2) and end this dialogue using the "Close" button (3). This returns you to the parameter dialogue.



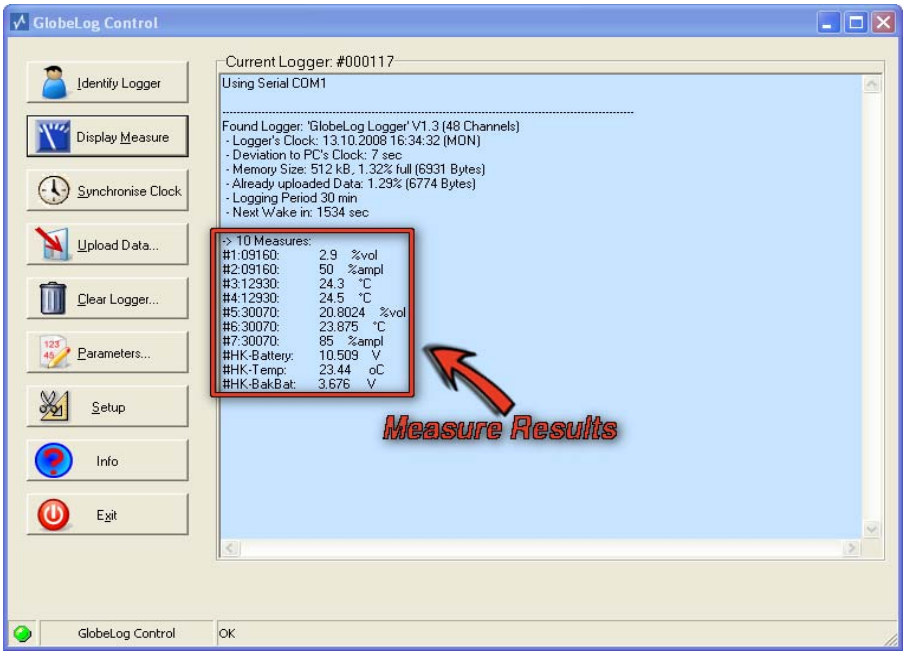
8. Next, load your configuration into the cache by clicking on the "Read Channels" button (1) and transfer them to the globeLog in a second step using the "Transfer" button (2). In doing so, the parameter dialogue closes and you find yourself back in the main window of the application.



9. The status bar enables you to keep track of the progress of the transfer process. When the status indicator (1) is green again, the globeLog configuration has been completed successfully.



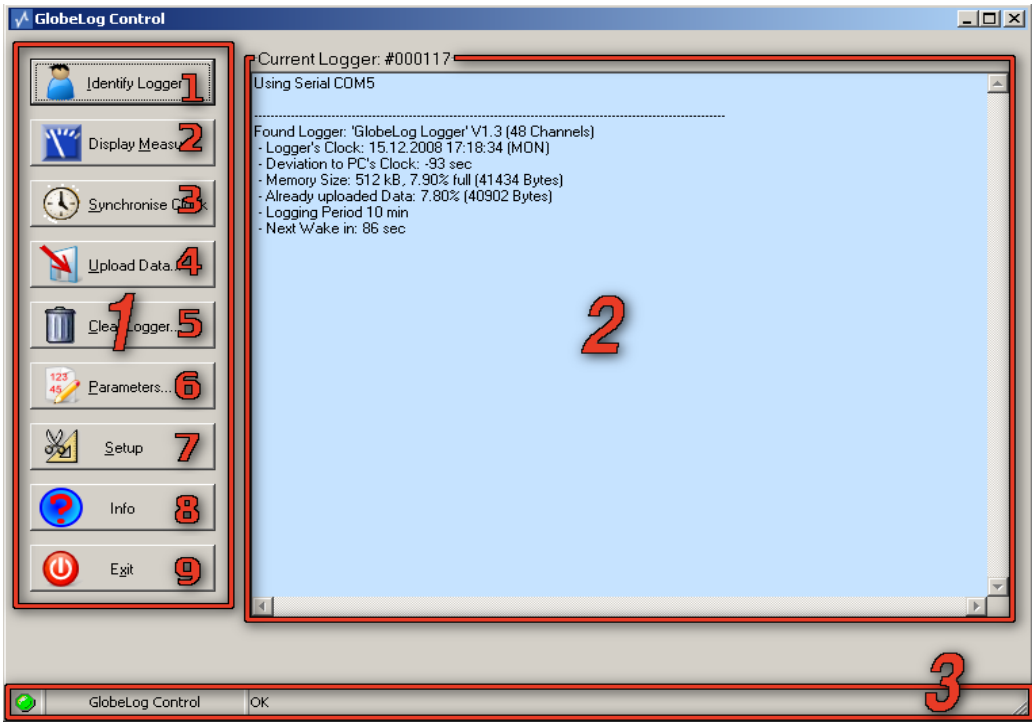
10. globeLog Control is now adequately configured for you to be able to perform a test measurement. To do so, click on the "Display Measure" "Display Readings" button. A dialogue opens that displays the progress of the measurement process. The measurement is complete as soon as this dialogue disappears.



11. The readings are displayed in text form as shown above. This marks the conclusion of the basic configuration of the globeLog. For more detailed information about configuring the module channels, the measurement interval, and GPRS functionality, please read the following sections.

5 The main window

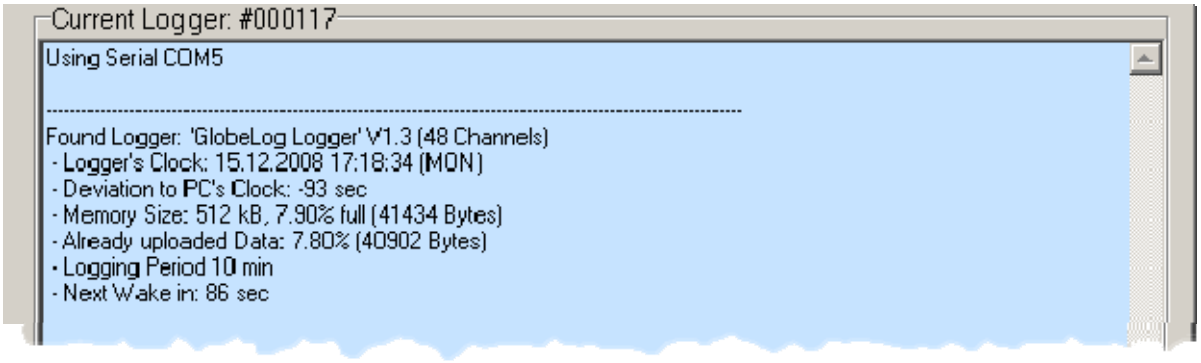
Immediately after launching the globeLog Control software you find yourself in the main window. The main window is the central starting point for all the functional areas of the software.



The main window comprises three areas. The button area (1), the console area (2) and the status area (3).

- The button area (1) has nine switching elements:

1. *Identify Logger:* this element identifies the connected globeLog and displays a few items of logger-internal data in the console area.
2. *Display Measure:* initialises a measurement by all the modules and probes connected to the globeLog and displays the resultant readings.
3. *Synchronise Clock:* this button synchronises the internal clock of your globeLog with your computer's time. (If you have purchased a globeLog with GPRS functionality and use it, your logger synchronises the internal clock with a time server in the Internet every time you log in on the Internet.)
4. *Upload Data...:* copies the readings saved in your globeLog to your computer.
5. *Clear Logger...:* erases all the readings stored in your globeLog and clears the memory.
6. *Parameters...:* opens the parameters dialogue. For more detailed information, please refer to the section "Global settings in the parameters dialogue".
7. *Setup:* opens the setup dialogue. For more detailed information, please refer to the section "Setup settings".
8. *Info:* displays information about your version of globeLog Control.
9. *Exit:* closes the globeLog Control programme.

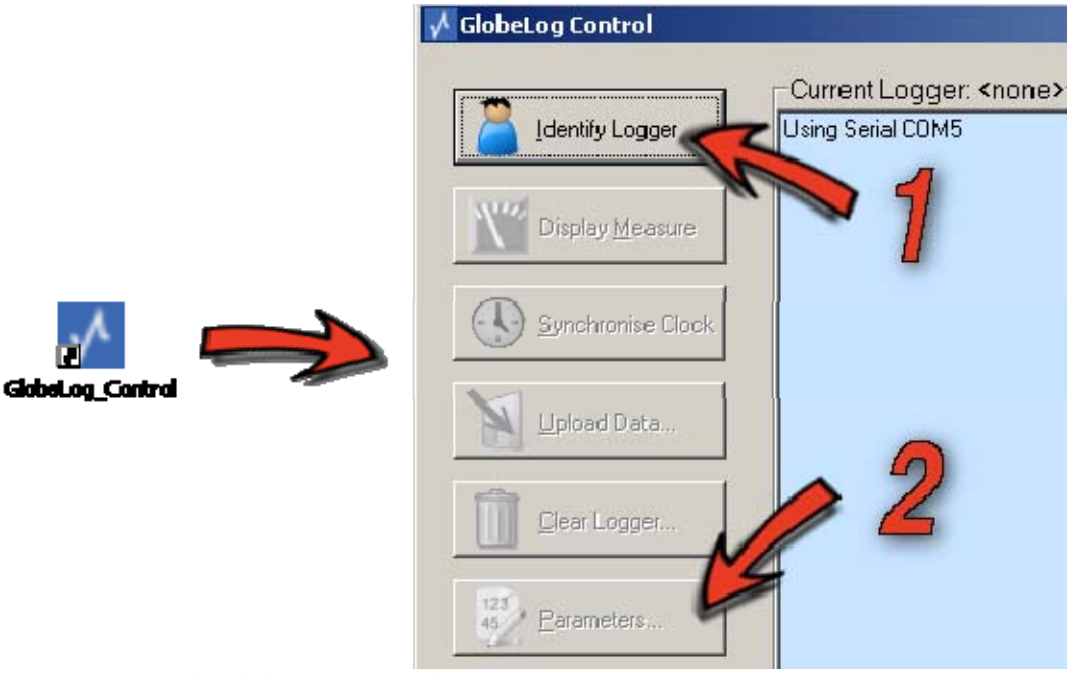


- The console area (2) is for displaying information about the communication process with your globeLog.

- The status area (3) shows the status of the globeLog Control software with the aid of the indicator lamp (1) on the lefthand side. "Red"means that the software is active, "Green" means that the software is waiting for your input. The righthand side (2) shows information about the task being processed at that moment.

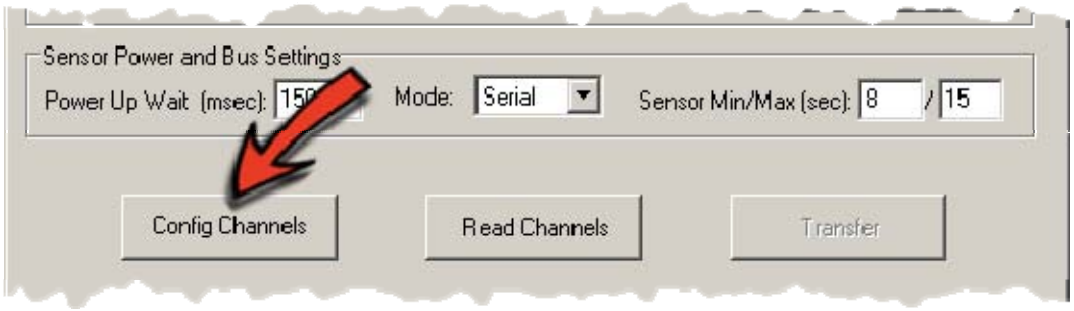
6 Configuring the SM module and sensor channels

The following steps are required to enable the configuration of the modules connected to your globeLog and the channels that readings are to be taken on:

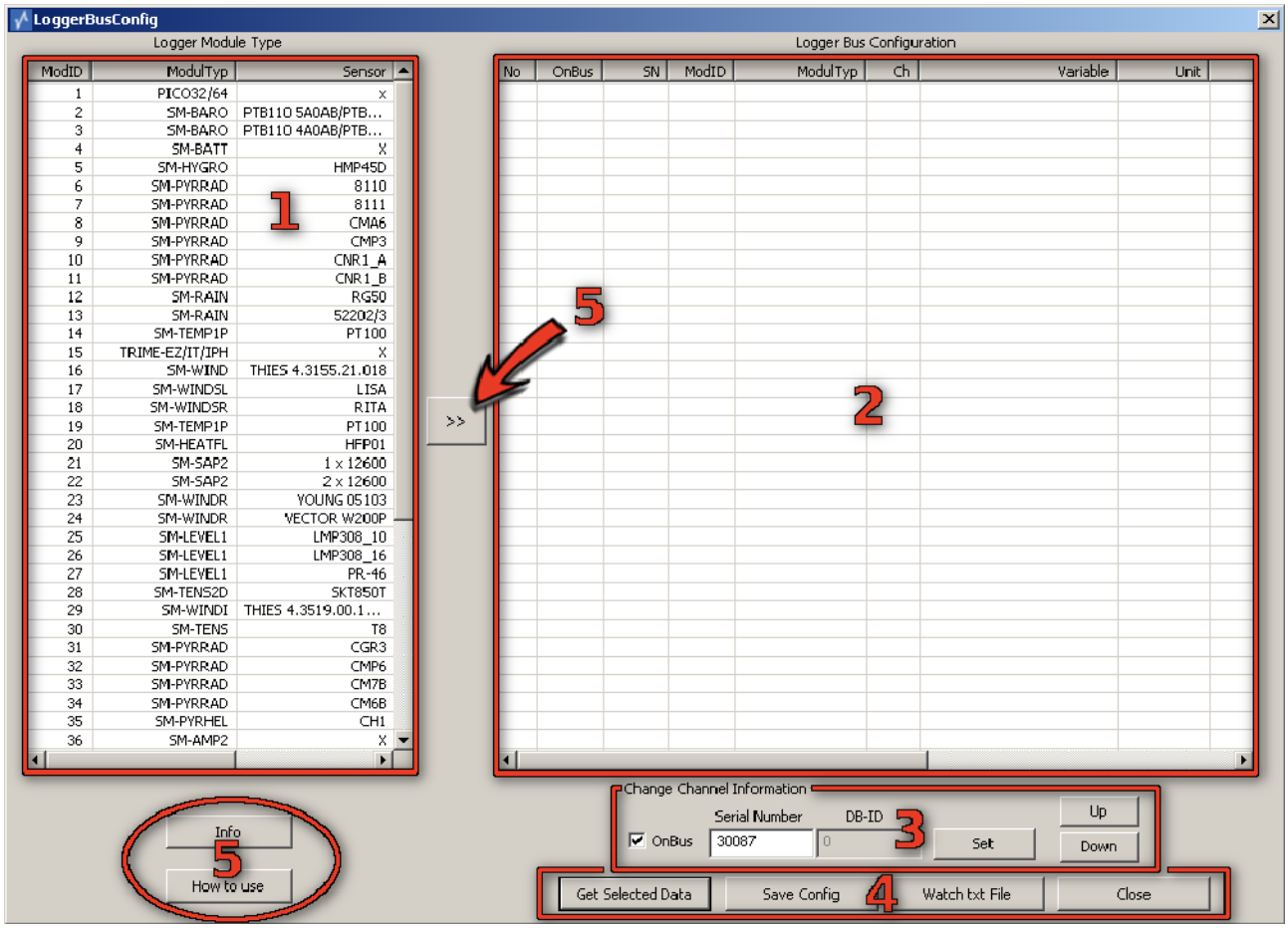


10. Start the globeLog Control programme:

11. Identify your globeLog using the "Identify Logger" button (1) and then open the parameter dialogue using the "Parameters..." button (2). The following dialogue appears:

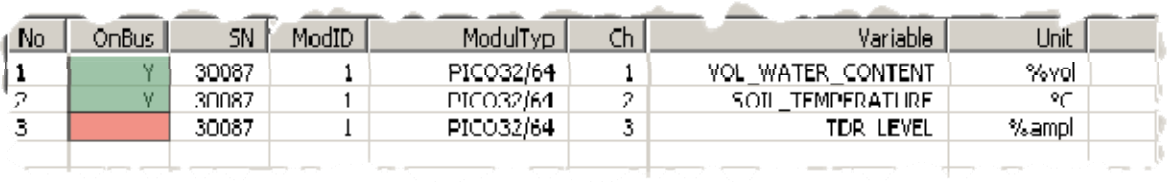


12. The documentation on the settings options for this window can be found in the section "Global settings". You can summon the settings dialogue for the modules and module channels from here by clicking on the "Config Channels" button. The following window appears:

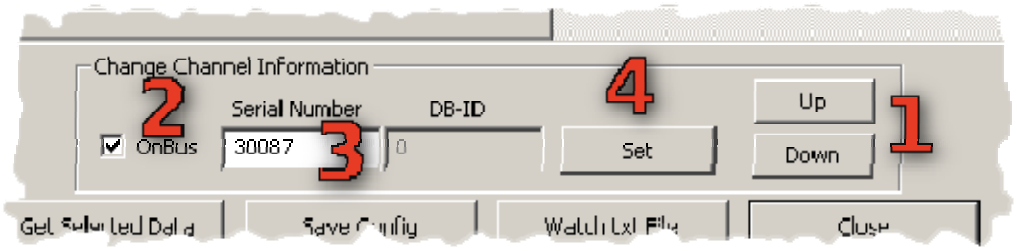


13. The window above is divided into five areas: "Logger Module Type" (1), "Logger Bus Configuration" (2), "Change Channel Information" (3), and "Help & Info" (4) and (5).

- In area (1) you can see a predefined list of all the available SM modules and sensors to be operated on your globeLog.
- In area (2) you can collate the present bus configuration of your globeLog from the sensor and module library (1). To do so, mark a probe in the measurement probe library (1) using the mouse and then click on the ">>" button (5).



- Once you have added a module and/or sensor to your bus configuration, you will see in area (2) all the measurement channels for this probe. You can change the "OnBus" status of this channel by double-clicking on the appropriate channel of your measuring probe. An "OnBus" status of "Y" (green box) means that your globeLog is using this channel to take a reading.

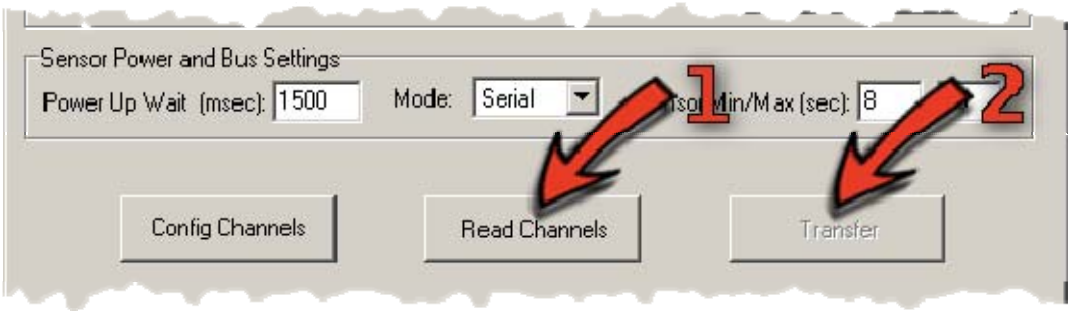


- Area (3) as shown in Item 13 is a settings dialogue for the measurement probe channels. You can navigate through the channels list using the "Up" and "Down" buttons shown by (1). The "OnBus" status of the selected measurement probe channel can be set using box (2). The serial number of the channel can be changed using box (3) and the changes saved by clicking on the "Set" button (4).

- Area (4) as shown in Item 13 comprises four buttons. The " (fetch Get Selected Data" button (1) updates your collation of the measurement probe channels. In doing so, channels for which the "OnBus" status has not been set are removed from the list. The "Save Config" button (2) **saves** the curren configuration on your computer. The "(view) Watch txt File" button (3) opens a selection dialogue for selecting the module-channel-configuration file (ConfigCh.txt) and opening it with a text editor. The "Close" button (4) closes the whole configuration dialogue **without** saving the changes.

- Area (5) enables you to summon this document and some brief information on the version.

14. Once you have changed the configuration of you globeLog logger, saved the changes, and closed the configuration dialogue, you must now transfer the changed configuration to your globeLog. You can now see the "Parameters..." dialogue again:

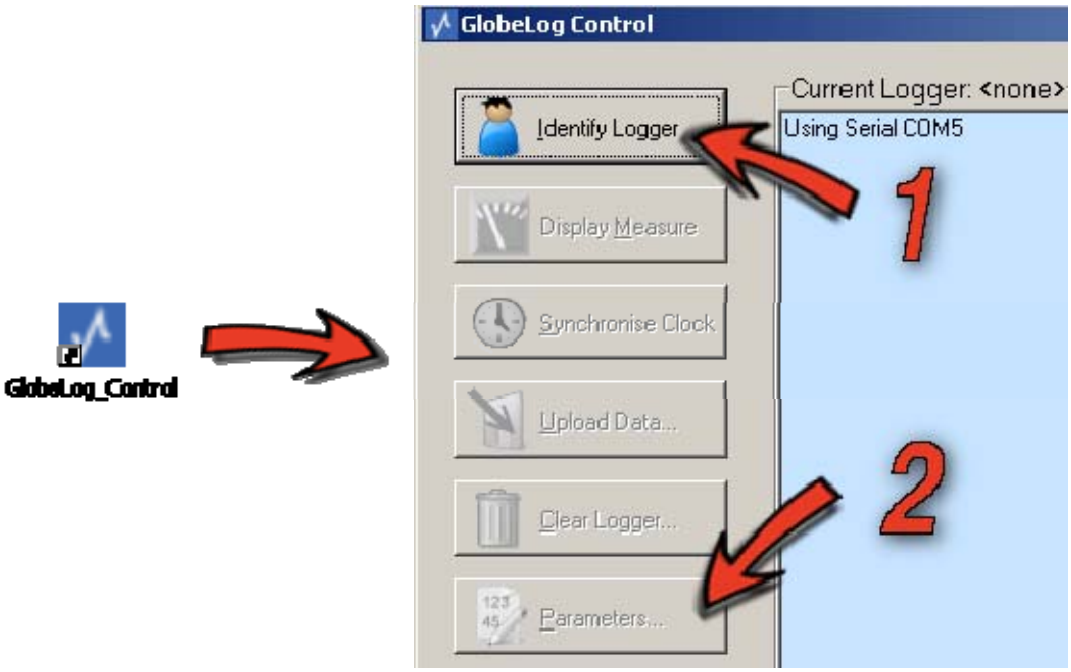


15. Here, first load the changed configuration file into the memory using the "Load Read Channels" button (1) and then transfer the new configuration to your globeLog using the "Transfer" button (2).

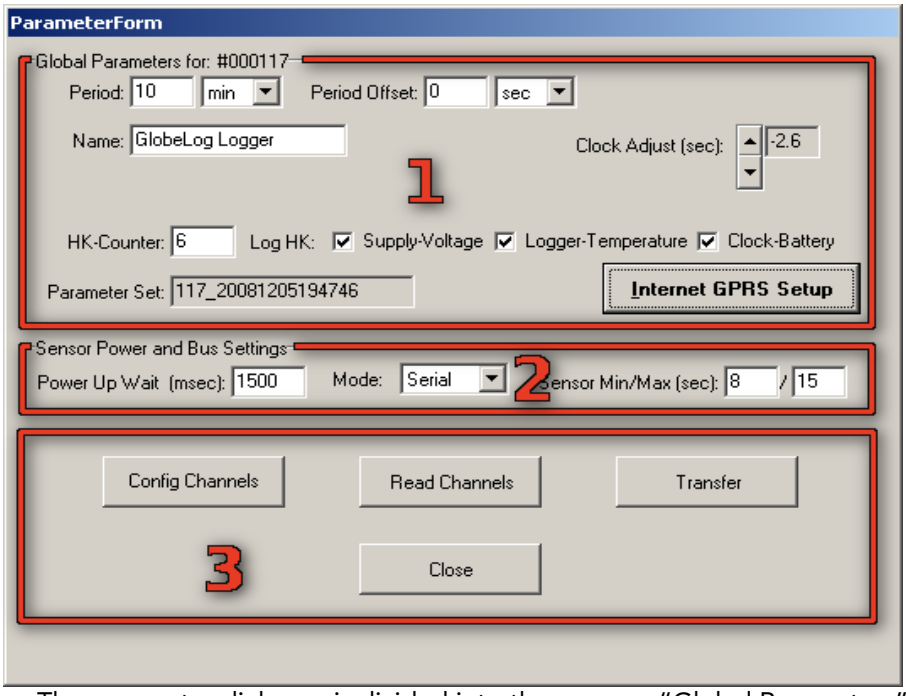
7 Global settings in the parameters dialogue

In globeLog Control's parameter dialogue you can set, for example, the time and frequency of the measurement cycles, you can specify how often the operating parameters of your globeLog are to be recorded, and you can set bus-specific parameters. To change he global settings of your globe-Log, proceed as follows:

16. Start globeLog Control via the desktop icon:

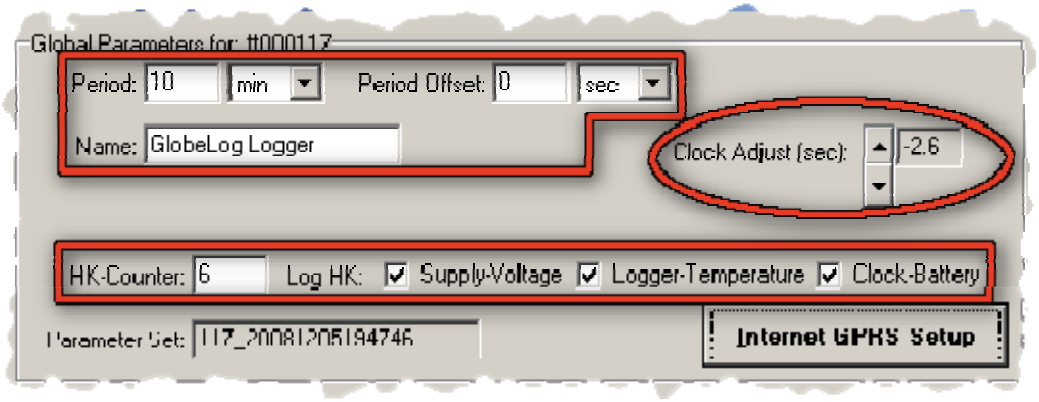


17. Identify your globeLog using the "Identify Logger" button (1) and then open the parameter dialogue using the "Parameters..." button (2). The following dialogue appears:



18. The parameter dialogue is divided into three areas: "Global Parameters" (1), "Sensor Power and Bus Settings" (2), and (3) in which the SM modules and channel configuration can be changed and transferred to the logger.

19. The "Global Parameters" area (1) contains the following setting options:



- *Period:* frequency of the measurements. In the example, every 10 minutes, starting at 00.00 (midnight).
- *Period Offset:* shifts the starting time forward from 00.00. A figure of 3 min combined with a period of 6h, for example, would mean that your globeLog would take measurements at 00.03 a.m., 06.03 a.m., 12.03 p.m. and 18.03 p.m.
- *Name:* name of your globeLog.
- *Clock Adjust (sec):* adjusts your globeLog's time.
- *HK-Counter:* this figure determines how often the HK (house-keeping) parameters of your globeLog are to be saved along with the readings. A figure of 6, as shown in the example above, means that with every sixth measurement cycle the HK paramerters are saved as well.
- *Log HK:* here you can specify which HK parameters are to be measured.
- *Parameter Set:* ID string of the current configuration.

- *Internet GPRS:* see section "GPRS configuration".

20. The "Sensor Power and Bus Settings" area (2) contains the following setting options:

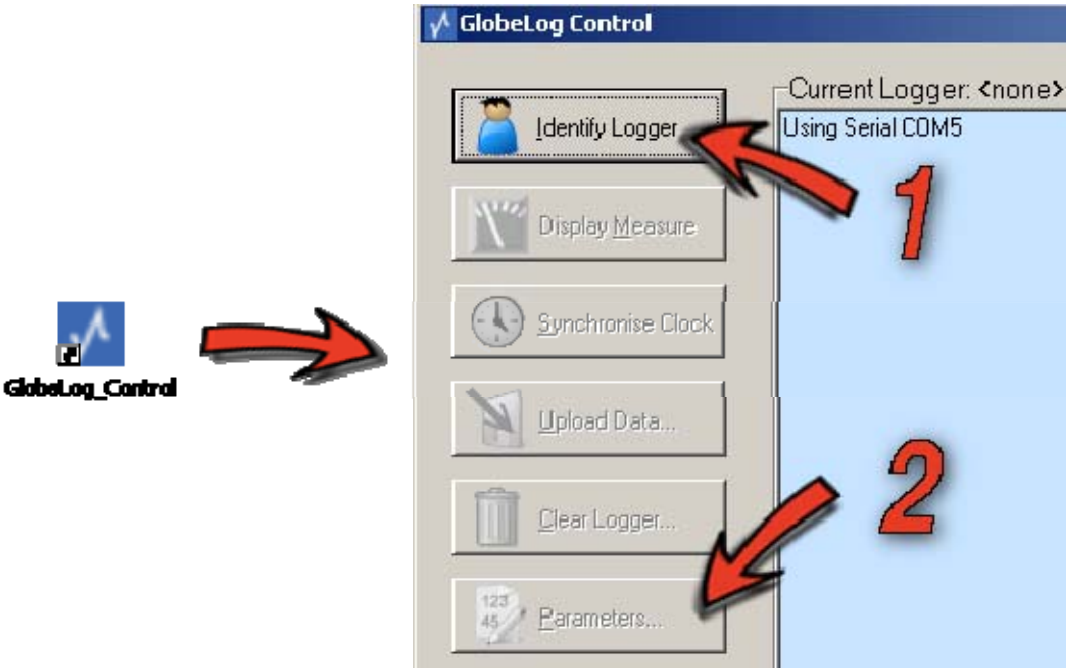
- *Power Up Wait (msec):* the time that your globeLog waits for the measurement bus after the power has been switched on before giving the connected modules and sensors the command to measure. The reason for this is that every module and every sensor requires a little time for initialisation.
- *Mode:* serial or parallel communication with the probes. Parallel communication up to a maximum of 3 modules on the measurement bus. Serial operation is recommended.
- *Sensor Min/Max (sec):* minimum/maximum time in seconds after switching on the bus before your globeLog sends the command to the modules to commence measuring.

21. Area (3) contains the buttons to access the configuration of the SM module and sensor channels and to transfer the altered configuration to your globeLog. More details can be found in the section "Configuring the SM module and and sensor channels".

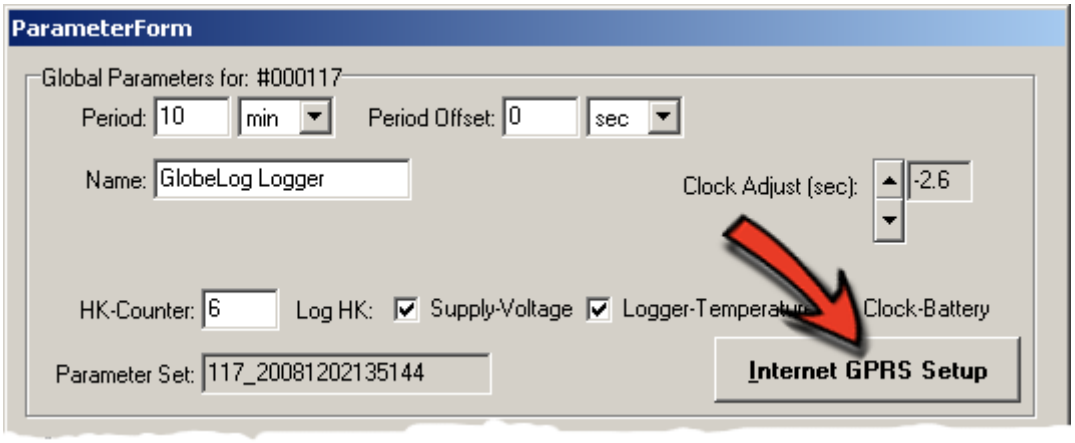
8 GPRS configuration

If you have purchased a globeLog with GPRS module, you have the option of having the readings sent to you by email and having having them saved automatilcally in a database.

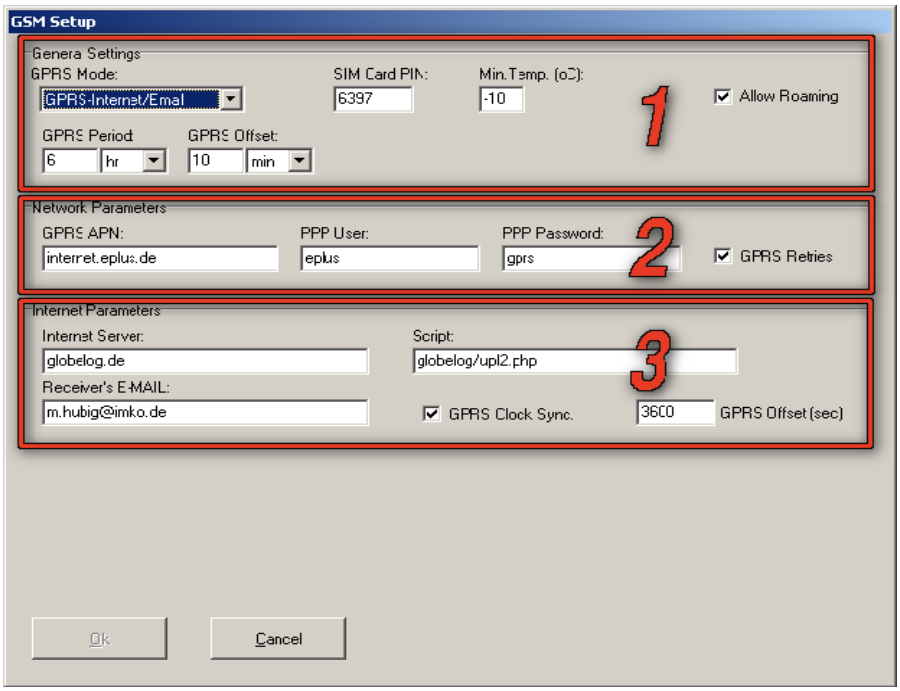
1. To call up the settings dialogue for the GPRS functionality of your globeLog, proceed as follows: start the globeLog Control programme:



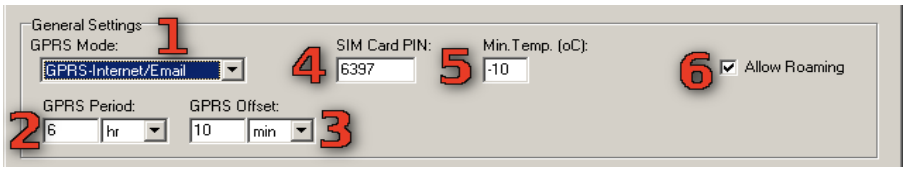
2. Identify your globeLog using the "Identify Logger" button (1) and then open the parameter dialogue using the "Parameters..." button (2). The following dialogue appears:



3. The documentation on the settings options in this window can be found in the section "Global settings". Clicking on the "Internet GPRS Setup" button here brings you to the following dialogue window:



4. The window above is divided into three areas: "General settings" (1), "Network parameters" (2), and "Internet parameters" (3).
5. The following settings can be made in the "General Settings" area (1):



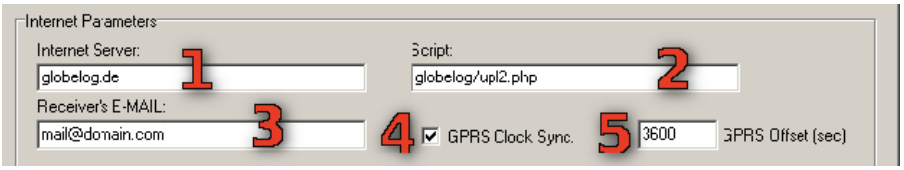
1. *GPRS Mode:* the GPRS functionality can be switched on or off here.
2. *GPRS Period:* here you can set the period of time after which your globeLog logs in to the Internet and transfers the readings.
3. *GPRS Offset:* for setting the time for the first readings transfer. (00:00 + GPRS Offset)

   In the example above, the globeLog would transfer the gathered sets of readings at 00.10 a.m., 06.10 a.m., 12.10 p.m., and 18.10 p.m.
4. *Sim Card PIN:* here, please enter the PIN of you SIM card. You receive this from your mobile phone service provider.
5. *Min. Temp. (°C):* here you can enter the minimum temperature down to which an attempt is to be made to establish a connection with the mobile phone network. The temperature relevant for this are measured inside your globeLog. We recommend a value of -10°C.
6. *Allow Roaming:* tick this box if you want your GSM module to establish a connection with the Internet in a foreign mobile phone network by means of data roaming. *Note:* this could entail higher connection charges.

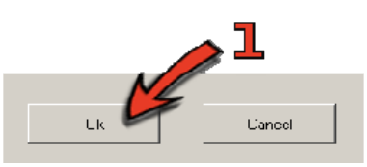
6. The following settings can be made in the "Network Parameters" area (2):

   1. *GPRS APN:* enter the address of your mobile phone provider's GPRS access point here.
   2. *PPP User:* enter your GPRS username here.
   3. *PPP Password:* enter your GPRS password here.
   4. *GPRS Retries:* here you can select whether your globeLog should retry logging in when GPRS connection errors occur or the gathered data should not be sent until the next scheduled transfer attempt.

7. The following settings can be made in the "Internet Parameters" area (3):



   1. *Internet Server:* DNS name of the Internet server to which your globeLog is to send the gathered data.
   2. *Script:* path name of the HTTP server script that is to receive the gathered data.
   3. *Receiver's E-MAIL:* email address to which the sets of readings are to be sent after transmission.
   4. *GPRS Clock Sync:* tick this box if your globeLog is to synchronise its internal clock with an NTP server in the Internet during every GPRS transmission.
   5. *GPRS Offset:* enter here how many seconds your local time deviates from GMT ("*Greenwich Mean Time*").

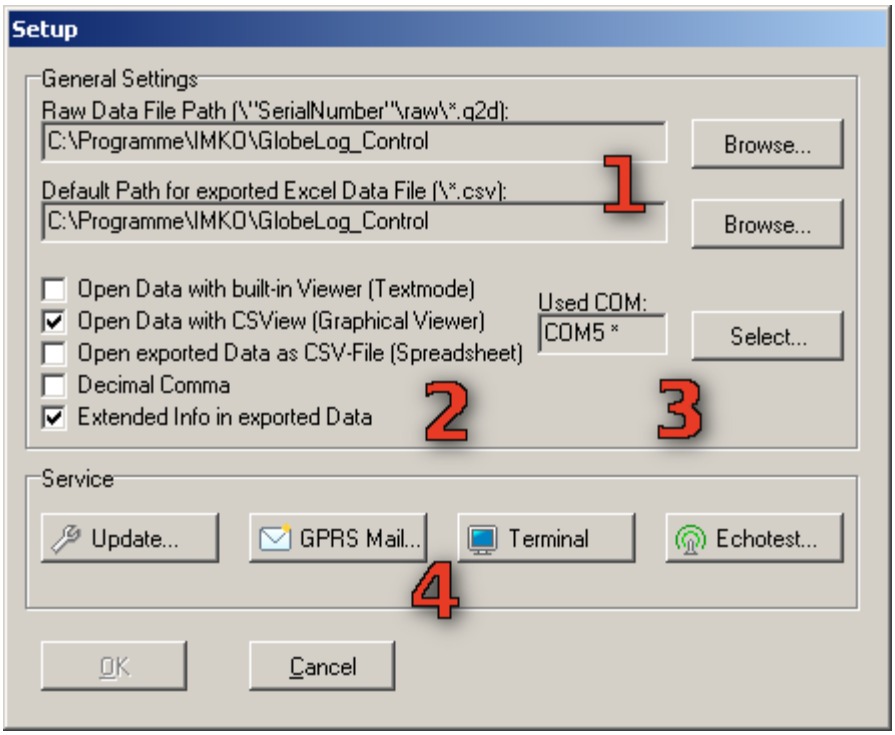


8. If you have changed settings in the GPRS dialogue, do not forget to **save** your changes using the "OK" button (1). When the GPRS dialogue has closed, you must still transfer the changed settings to your globeLog. To do so, click on the "Transfer" button (2) in the parameters dialogue.

9 The setup dialogue

In the setup dialogue you can set set various data paths, select the COM interface, and establish a variety of settings that change the behaviour of the globeLog Control software.

After starting globeLog Control, enter the setup dialogue by clicking on the "Setup" button. The following dialogue window appears:



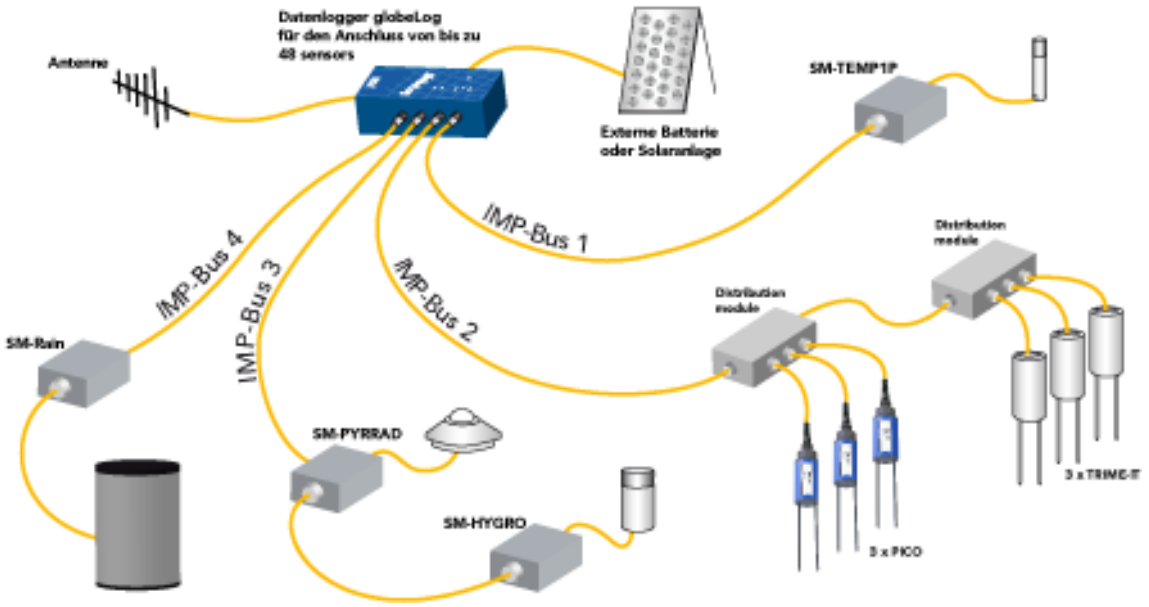
The setup dialogue comprises four areas:

1. Settings options for paths that the sets of readings received from globeLog are to be saved under ("Raw data path") and for exporting the readings in Excel format ("Default path for export Excel data fFile").
2. Option buttons for setting various parameters:
   - Comma as decimal separator (CAVE: often impractical when electronically processing the readings).
   - Additional information in the exported data. If this parameter has been ticked, the logger integrates various "Housekeeping" data into the transferred sets of readings (power supply, temperature, back-up battery voltage).
3. You can select the appropriate COM port of your computer of the USB-RS 232 adapter using the "Select..." button.
4. Various service functions.

Button **(1)** opens a file-selection dialogue which enables you to load a new firmware into your globeLog. Button **(2)** sends an email via GPRS for test purposes to the email address specified in the GPRS setup. Button **(3)** opens a terminal that enables you to send direct commands to your globeLog. Button **(4)** starts a simple echo test and tests the logger's accessibility.

10 Example layout

Spannungsversorgung über 220V, externe Batterie oder Solaranlage



11 Some of the most important technical data

- *Weatherproof case, protection type IP67*
- *Power supply 10..24V/DC (12V recommended)*
- *Automize data transmission via GSM/GPRS (optional)*
- Data memory *2MB capacity (Flash)*
- *Connect up to 48 sensors*

12 Technical data in detail

TYP:	Datenlogger globeLog®
Casing:	
- protection class	- IP67
- dimensions	- 175 x 80 x 55mm
- weight	- 1,1kg
- connectors	- circular plug-in connector with inserted nuts, Binder Serie 723
Power supply:	
- external	- 10..24V/DC (12V recommended)
- Power consumption:	
Sleep (between the measurements)	- approx. 0,1mA
Idle (active, but no measurement)	- approx. 10mA
During the measurement	- approx. 35mA (only Logger, sensors according to configuration of the system)
During the data communication	- 30..50mA according to network quality
Temperature:	
- Logger	- from -40 to +60°C
- Modem	- from -20 to +60°C (sub-limit selectable, lower than -10°C with limited functionality)
On-site data transmission:	
- Interface	- RS232
- required Software	- GlobeLogControl
- required Hardware	- Windows-PC with Windows2000 or higher
Remote data transmission:	
- Hardware	- Internal Quad-Band GSM-Modem
- Data service	- GSM/GPRS
- Transfer protocol	- http
- Transfering costs (daily data transmission)	- Lower than 1€ (in Germany, country-specific, nevertheless you have to pay only for local

	connection)
- required Software (for remote maintenance and data storage)	- GlobeLogControl
- required Hardware	- Windows-PC with Internet access, Windows2000 or higher, data will be transfered via e-mail by the globeLog Logger
Data storage/Data logging:	
- Storage type	- data memory Flash (non-volatile memory)
- Memory size	- 2MB
- Organisation	- Data will be recorded until the memory is full. Further accumulating data will be lost
- Measuring interval	- 1min..12h
- Number of measured data	- >250.000
- Erasing of measured data	- on-site or via remote data transmission DFÜ (optional)
Input channels:	
- IMP-Bus 1-4	- Up to 48 channels (Sensors can be up to 3-channels)
IMP-Bus 1-3	- For Sensors with switched supply voltage (is switched of between the measurements)
IMP-Bus 4	For Sensors with permanent voltage
- Housekeeping channels	- 1x internal temperature - 1x supply voltage - 1x voltage of back-up battery
Internal Clock:	
- Type	- Real-time clock
- Accuracy	- maximum aberration 2 sec per day (adjustable in sensitivity depending on ambient temperature)
- Synchronisation	
On-site	- manual with GlogLogControl Software
Remote data transmission	- automatically while each data transmission
- Power supply	- via supply voltage; during a power failure on the internal buffer battery (lifetime 4-6 years)
Accessories:	
- Power cord	- 2m with 5-pol Binder connector and 2x Banana plug
- RS232-cord	- 6-pol Binder connector und DB9 connector
- CD with GlobeLogControl Software	- Windows2000 oder higher
- Manual	- English

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