

TrueLog100

Quickstart with TrueCon100
and SMT100 sensors

V1.1

english

www.truebner.de

TrueLog100 Quickstart with TrueCon100 V1.1

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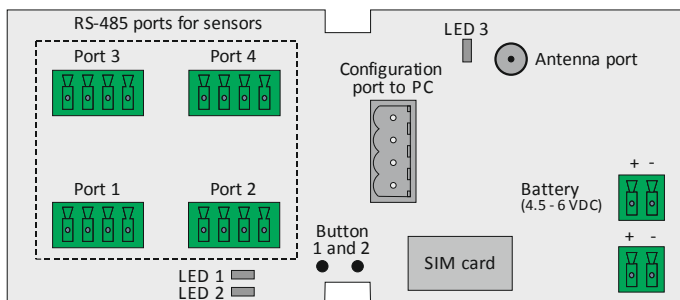
1 Introduction

This quickstart guide explains how to set up the logger TrueLog100 together with the TrueCon100 connector box for multiple SMT100 soil moisture/temperature sensors.

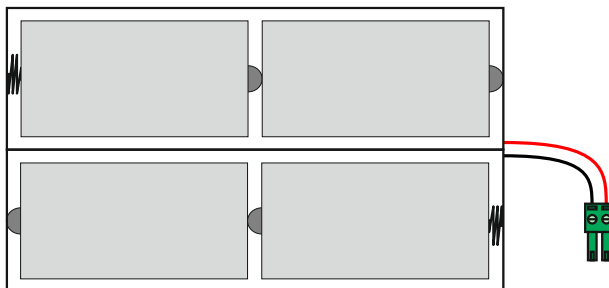
2 Required components

2.1 Datalogger TrueLog100

2.1.1 Baseboard



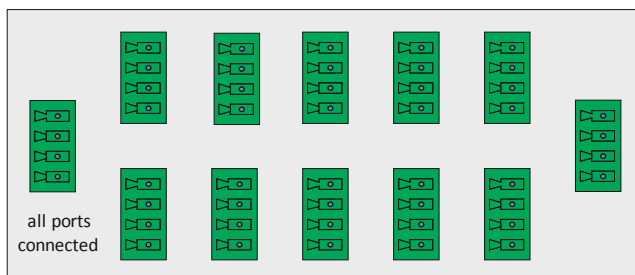
2.1.2 Battery holder with 2 pole power plug



2.2 USB cable for logger configuration



2.3 Connector box TrueCon100 with connectors



RS-485 plugs



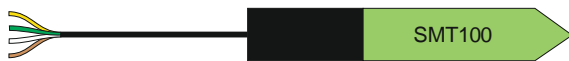
2.4 Cable between TrueCon100 und TrueLog100



2 x RS-485 plug



2.5 SMT100 sensors



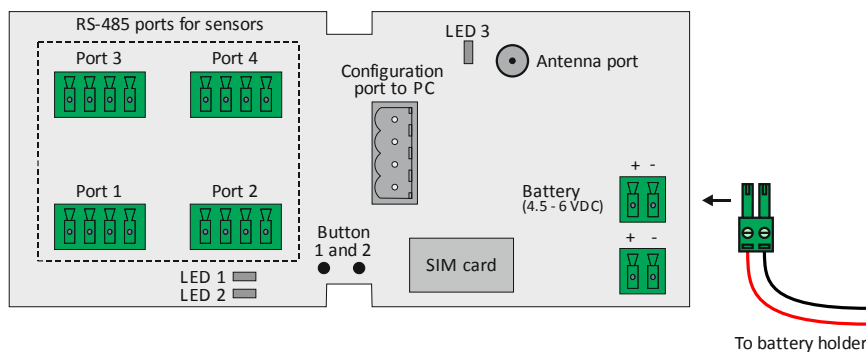
2.6 Batteries and screwdriver (supplied by customer)

- 4 x type D-cells (each 1.5 V alkaline)
- Screwdriver for RS-485 plugs

3 Installation

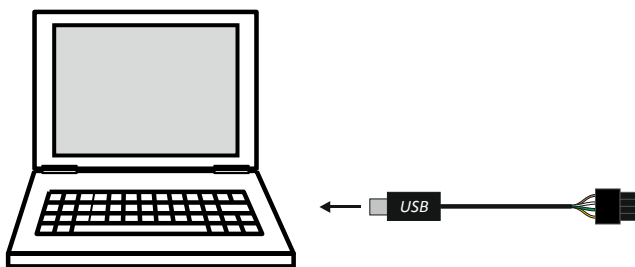
3.1 Step 1: Battery power supply

- Insert the batteries in the battery holder and connect the 2 pole power plug to the battery socket on the logger baseboard.



3.2 Step 2: Driver installation

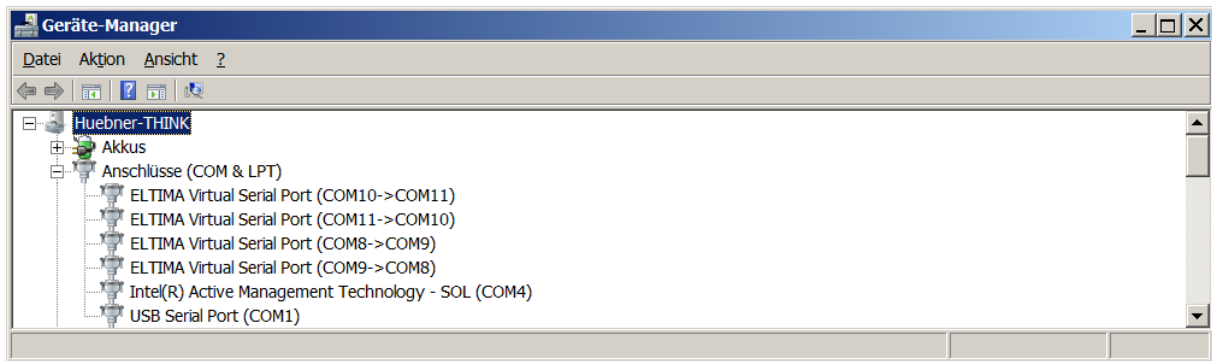
- Connect the USB cable to a PC to automatically install a “virtual” serial port.



Note

The serial port is only visible in the device manager, when the USB cable is plugged in and when the correct USB driver is installed. When the USB cable is connected for the first time, Microsoft Windows® automatically searches for the USB driver and will install it. Therefore the PC must be connected to the internet. The installation may take up to a few minutes and some computers require a reboot sequence after installation of the USB driver. As soon as the USB driver is installed properly, the cable will be recognized by Microsoft Windows® within a few seconds in the future. In the example below the serial port has the number 1: USB Serial Port (COM1).

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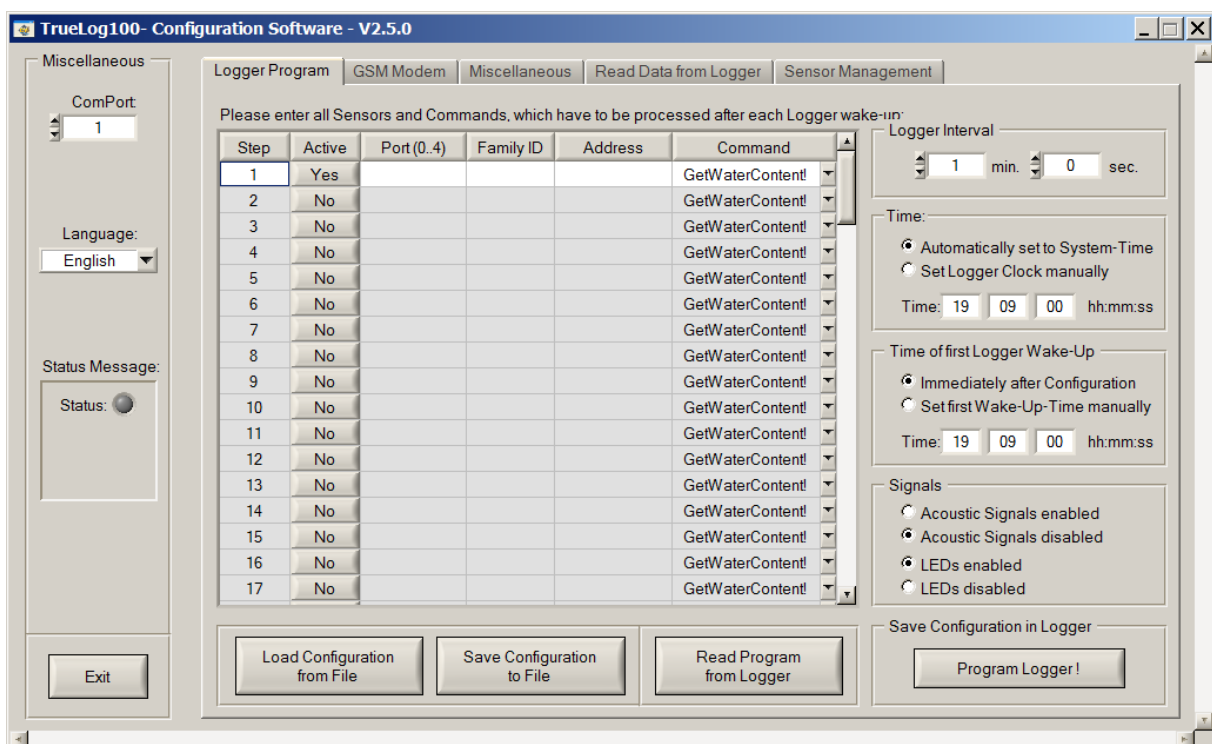


Note

In rare cases automatic installation of the driver may fail. The driver can be downloaded from <http://www.ftdichip.com/Drivers/VCP.htm> and installed manually.

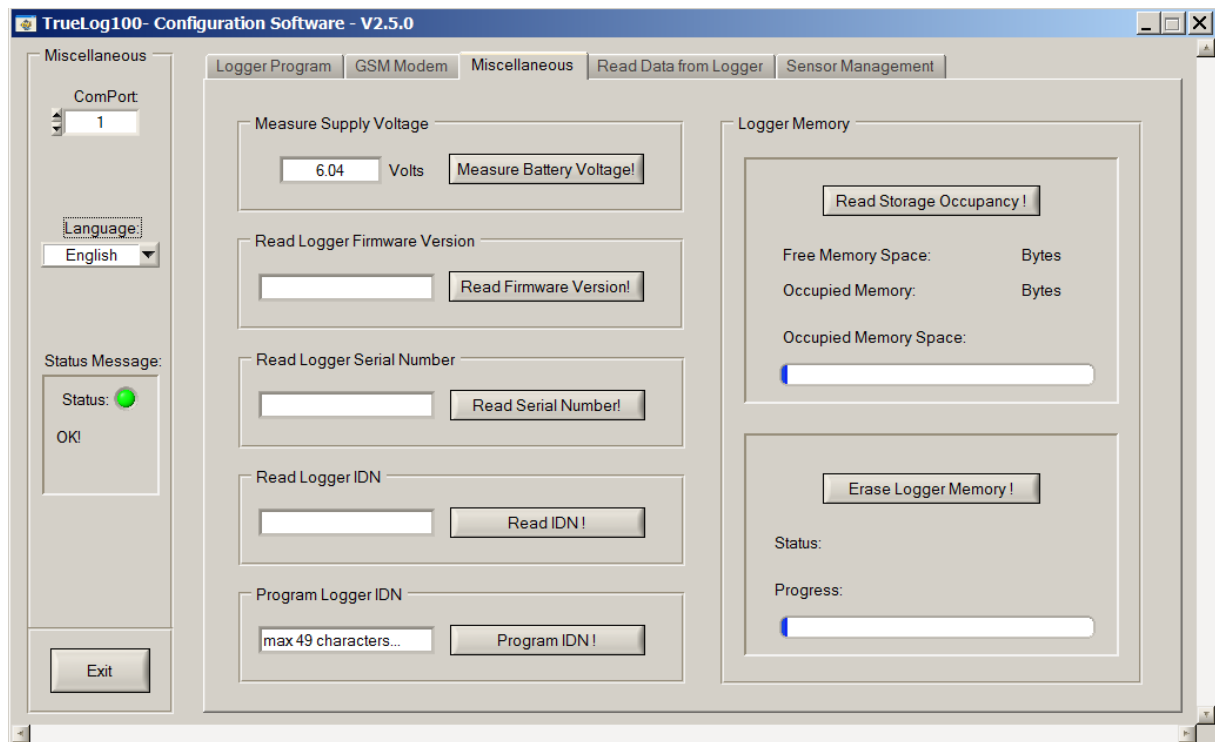
3.3 Step 3: Software installation

- Download the free configuration software for the TrueLog100 from <http://www.truebner.de/en/truelog100>. It is recommended to reboot your computer after installation of the software. After starting the program, the following screen appears:



- Verify the logger connectivity by choosing the tab "Miscellaneous" and press "Measure Battery Voltage" (about 6 V should be measured with fresh alkalines).

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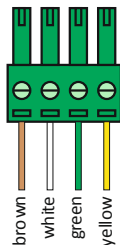
3.4 Step 4: SMT100 configuration

- Mount an RS-485 plug to the cable of an SMT100



Note

All RS-485 plugs have the same wiring code:



brown = +Vbat
white = GND
green = RS-485 A
yellow = RS-485 B

- Connect the RS-485 plug to **any** of the RS-485 sensor ports of the logger.
- Connect the USB cable to the logger configuration port.

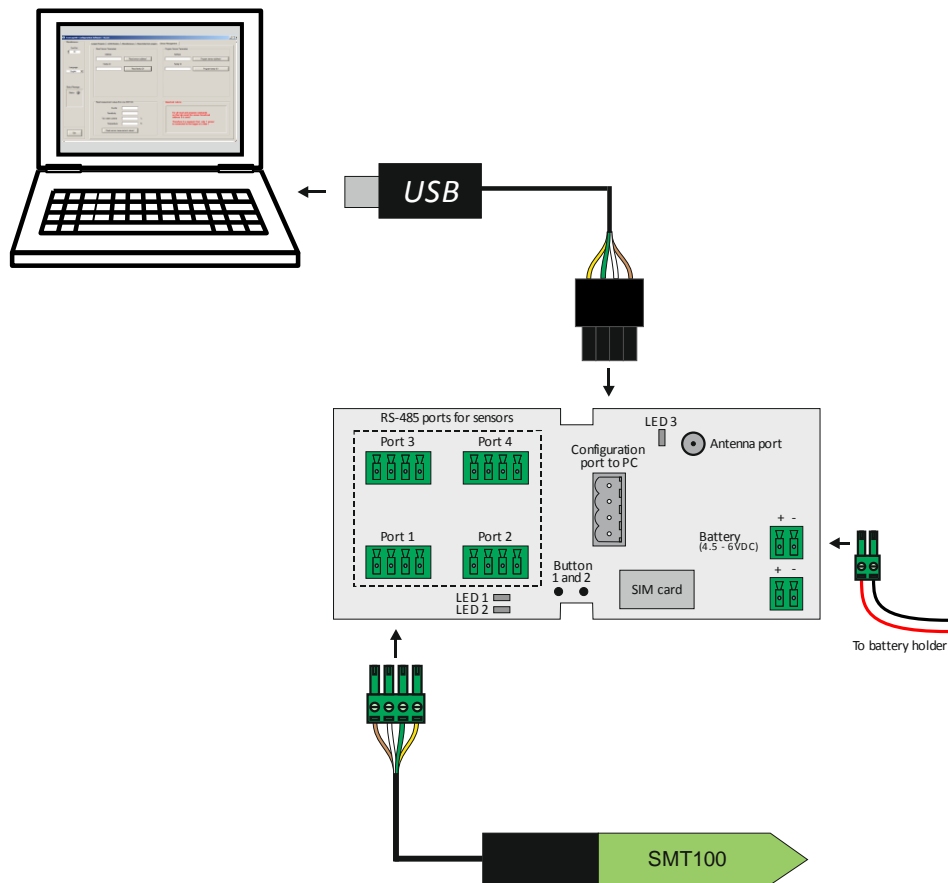


Be careful to insert the plugs with correct orientation!

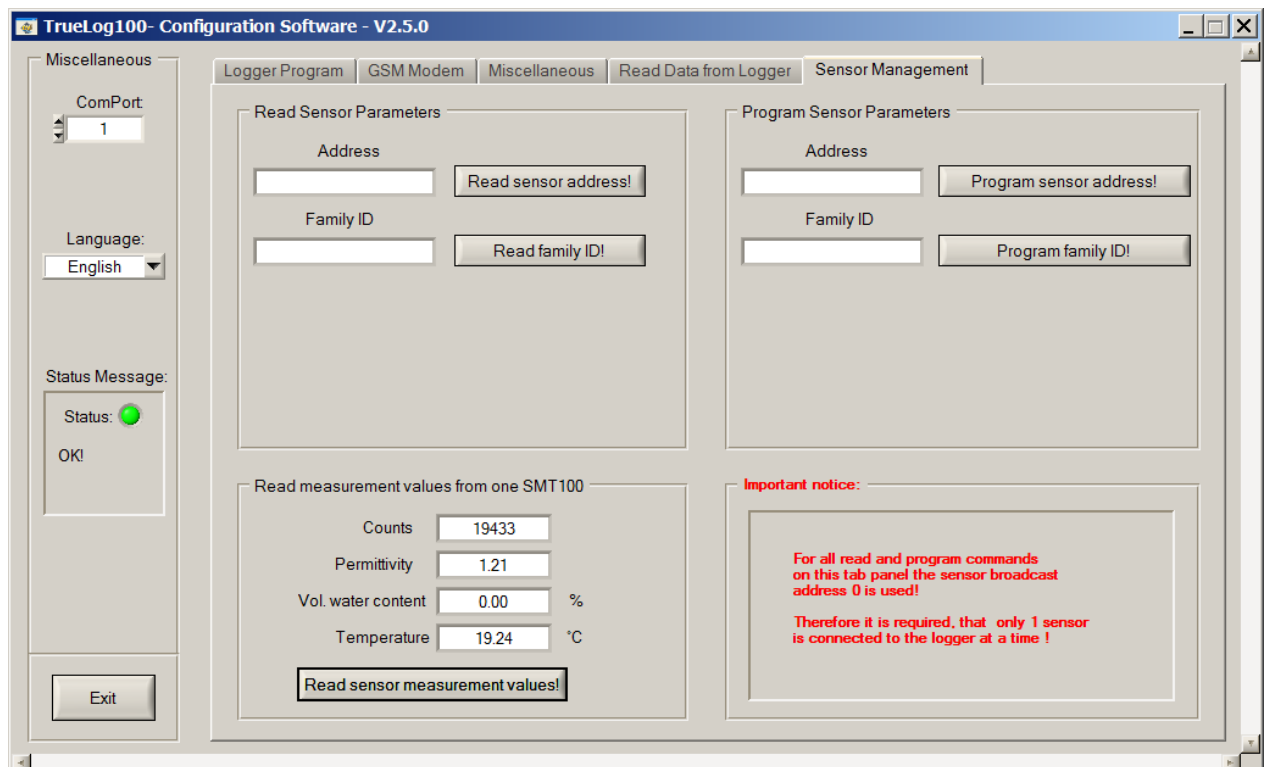
Note

All RS-485 sensor ports are connected together internally. So all sensors connected to the logger share a common RS-485 data bus. To distinguish between different sensors an individual address has to be assigned to each sensor.

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- Open the logger configuration software and choose tab “Sensor Management”. Verify connectivity of the SMT100 by pressing “Read sensor measurement values!”. Measurement values should be displayed.



TrueLog100 Quickstart with TrueCon100 V1.1

Note

All RS-485 sensor ports are connected together internally. So all sensors connected to the logger share a common RS-485 data bus. To distinguish between different sensors an individual address has to be assigned to each sensor.



When using the tab "Sensor Management" never connect more than one sensor to the logger! Otherwise unintentionally programming of sensors may happen!

- Configure each sensor according to the following procedure:

Connect sensor 1

Enter address 000001

Press „Programm sensor address!“

Label sensor 1 with a sticker

Remove sensor 1

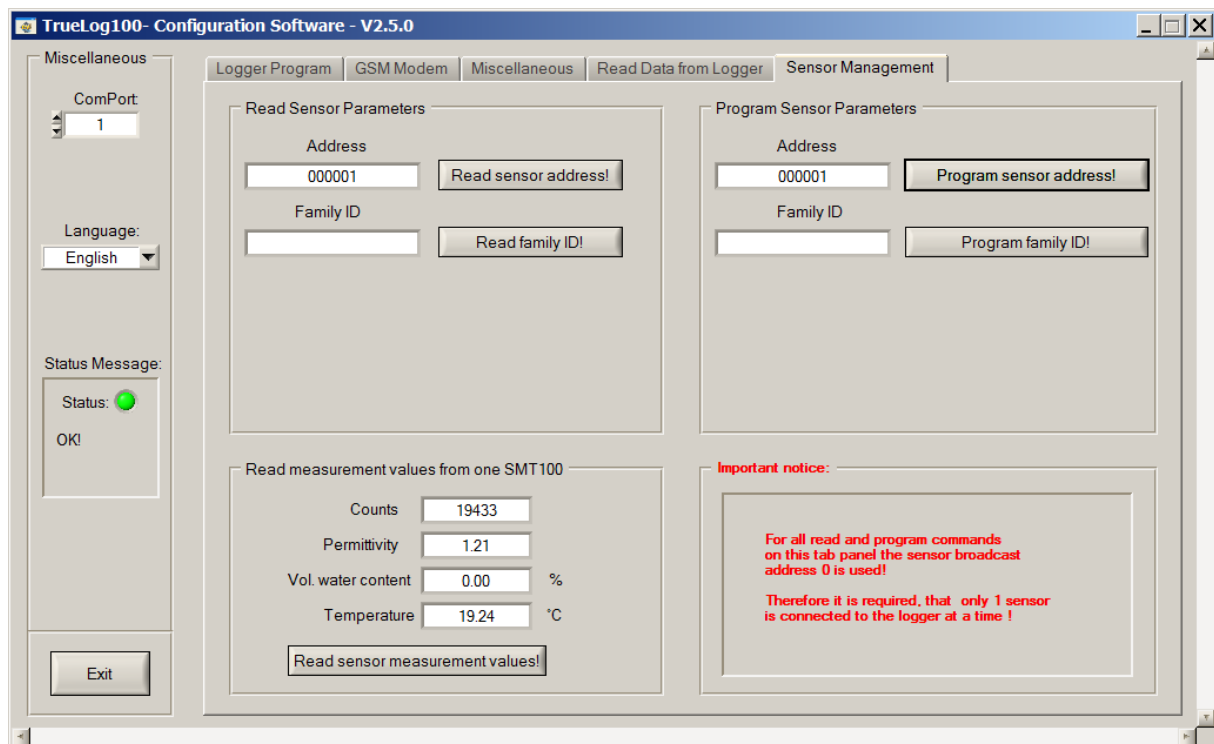
Connect next sensor



Note

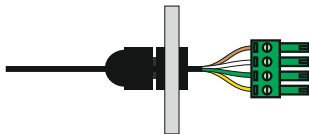
E.g. with 10 sensors address 000001 to 000010 are recommended. When pressing "Programm sensor address!" a subsequent "Read sensor address!" will automatically be performed to verify address change. It is not required to enter leading zeros in the address field.

TrueLog100 Quickstart with TrueCon100 V1.1



3.5 Step 5: TrueCon100 wiring

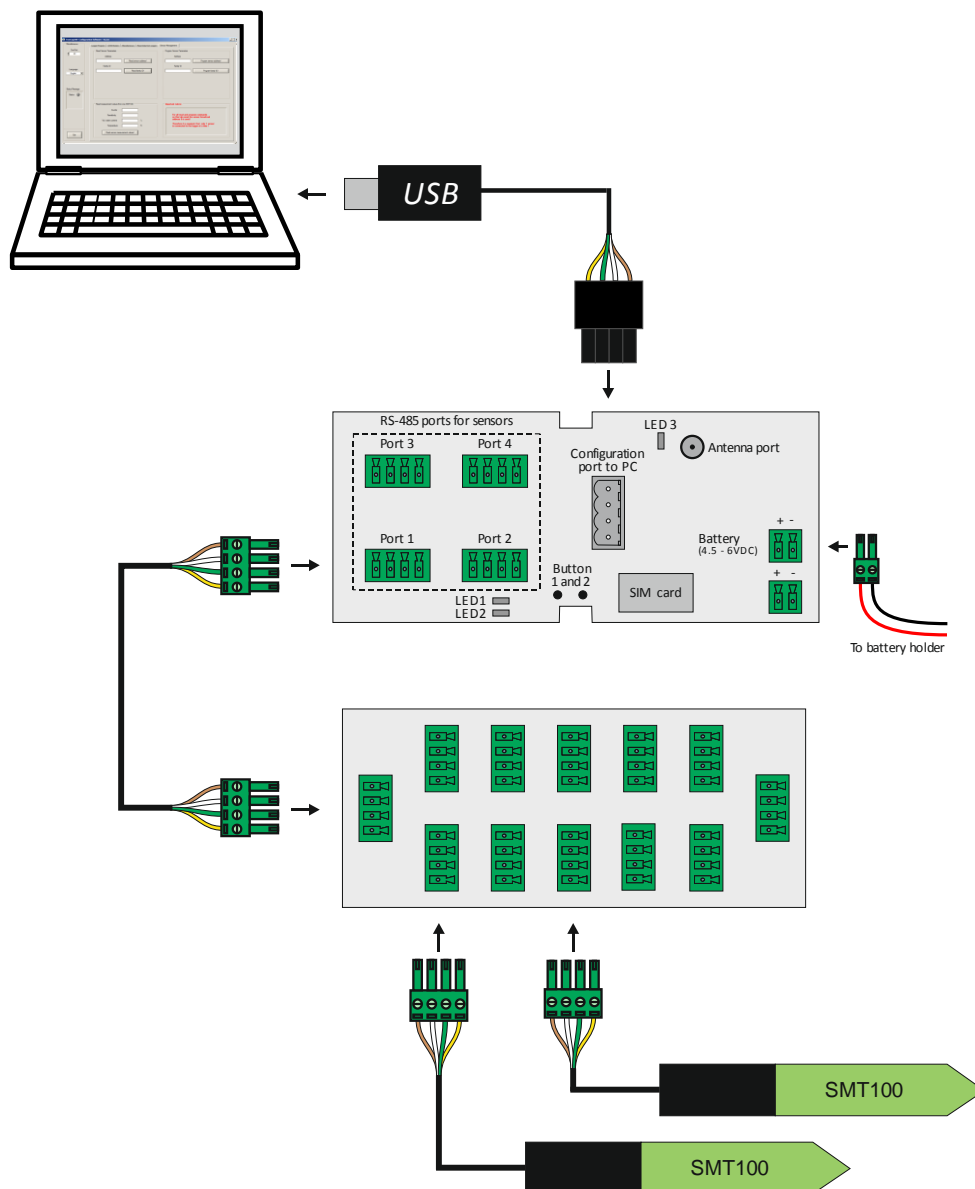
- Connect the TrueCon100 to the logger and connect all sensors. Pass the cables through the cable glands.



Note

All ports of the TrueCon100 are internally connected together. Therefore the ports can be arbitrarily used for any logger and sensors connections. Sensors are identified only by their assigned address and not by their socket position in the TrueCon100 or the ports of the logger.

TrueLog100 Quickstart with TrueCon100 V1.1



3.6 Step 6: Logger test program

- Enter a test program as shown below and modify according to the number of sensors in use.

Note

A TrueCon100 can handle one logger connection and up to 11 sensors. The three spare sensor ports at the logger can be used for sensors as well. So a maximum of 14 sensors can be connected to the logger and one TrueCon100.

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TrueLog100- Configuration Software - V2.5.0

Miscellaneous

ComPort: 1

Language: English

Status Message: Status: OK!

Exit

Logger Program

Please enter all Sensors and Commands, which have to be processed after each Logger wake-up:

Step	Active	Port (0..4)	Family ID	Address	Command
1	Yes	0	0	1	GetAllMeasurements
2	Yes	0	0	2	GetAllMeasurements
3	Yes	0	0	3	GetAllMeasurements
4	No				GetWaterContent!
5	No				GetWaterContent!
6	No				GetWaterContent!
7	No				GetWaterContent!
8	No				GetWaterContent!
9	No				GetWaterContent!
10	No				GetWaterContent!
11	No				GetWaterContent!
12	No				GetWaterContent!
13	No				GetWaterContent!
14	No				GetWaterContent!
15	No				GetWaterContent!
16	No				GetWaterContent!
17	No				GetWaterContent!

Load Configuration from File

Save Configuration to File

Read Program from Logger

Logger Interval: 1 min, 0 sec

Time: 19:38:21 hh:mm:ss

Time of first Logger Wake-Up: Immediately after Configuration

Signals: Acoustic Signals enabled, LEDs enabled

Save Configuration in Logger: Program Logger!

Note

It is recommended to save the logger program in a configuration file.

- Unplug the USB cable from the logger baseboard.



It is required to unplug the USB cable from the logger baseboard. Otherwise logging will not start.

- Wait until a few measurements are taken. Logger operation is notified by flashing of the LEDs on the logger baseboard. During measurement the logger LED lightens longer.

Note

LED code (if LEDs are not turned off in the logger configuration)

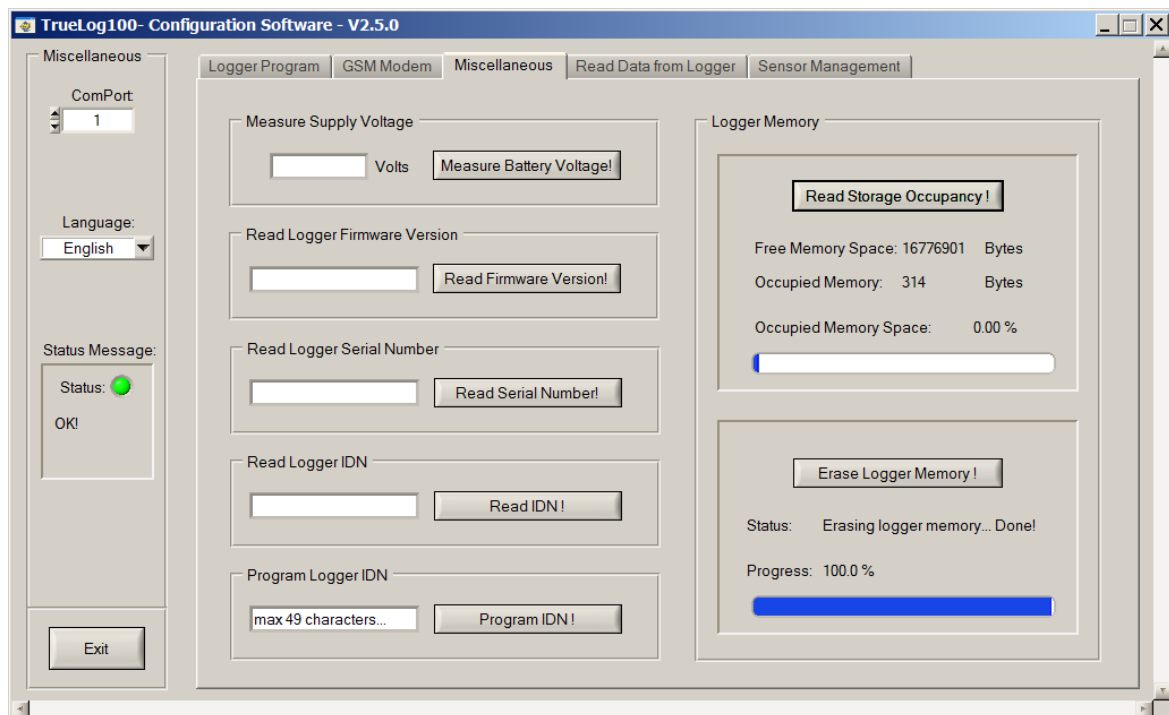
LED 1 flashing: Logger is operating in logger mode (for logger intervals of 1 minute or longer the LED flashes in an 8 second interval)

LED 1 on: Sensor measurement

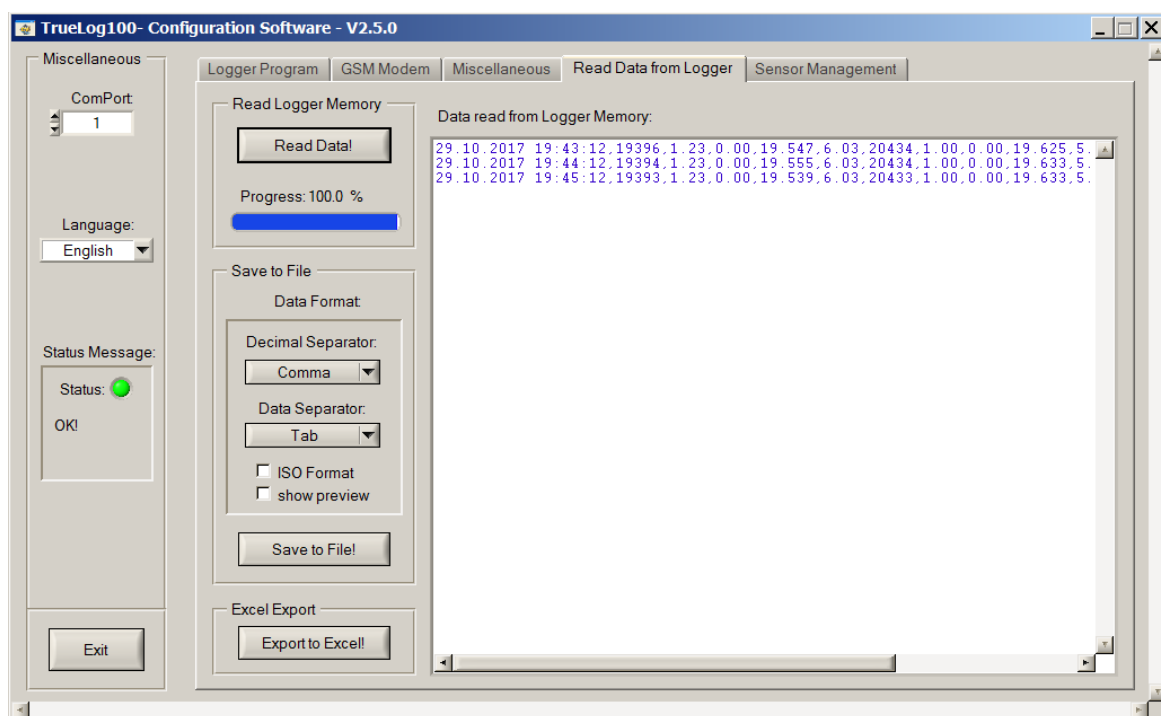
LED 2 on: Logger is in configuration mode (USB cable connected)

- Reconnect the USB cable to the logger baseboard.
- Check that data measurements have been stored by pressing "Read Storage Occupancy!" and observe "Occupied Memory". Each measurement will increase the amount of occupied memory.

TrueLog100 Quickstart with TrueCon100 V1.1



- Press “Read Data!” in the Read Data Logger tab to view stored measurements.

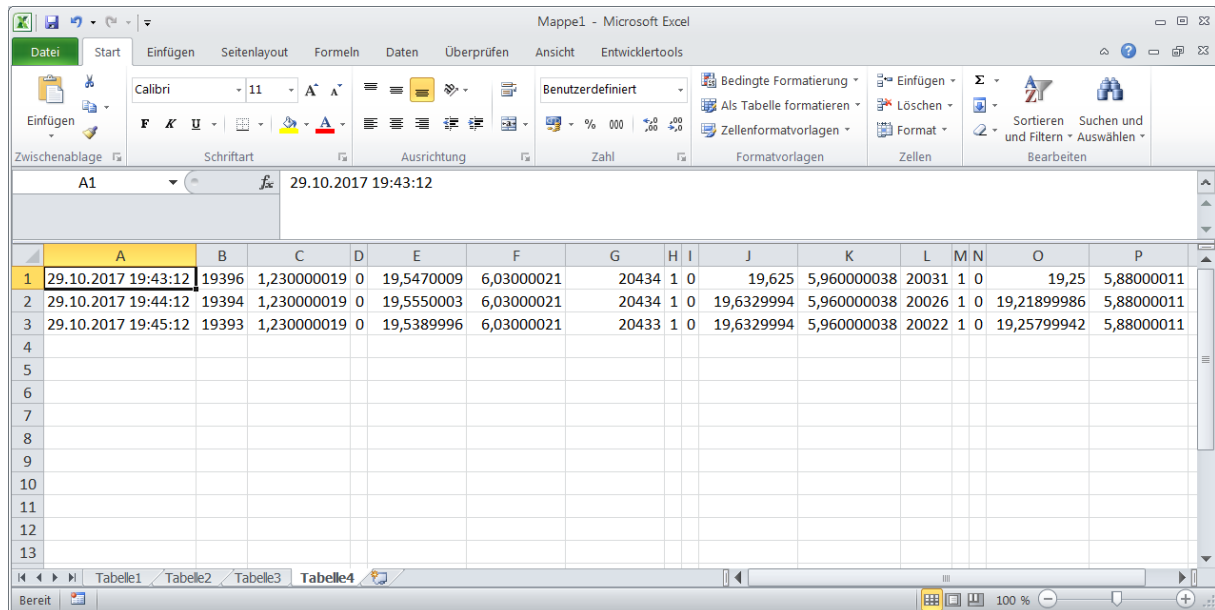


Note

There is no automatic column description. The measurement values appear in exactly the same order as entered in the logger program. Sensor interrogation commands can deliver one or more measurement values (e.g. GetWaterContent delivers one measurement value and GetAllMeasurements delivers 5 measurement values). All measurement values are separated by commas. If there are commas directly one behind the other then the corresponding sensor did not respond.

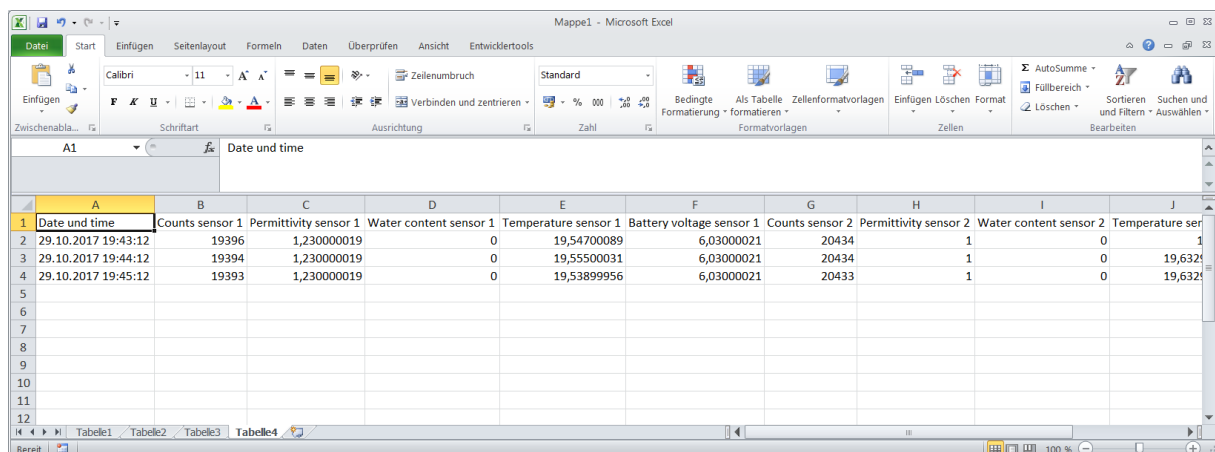
TrueLog100 Quickstart with TrueCon100 V1.1

- Optionally export the measurement data to Excel (choose csv type data export options for large datasets since Excel export is slow).



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	29.10.2017 19:43:12	19396	1,230000019	0	19,5470009	6,03000021	20434	1	0	19,625	5,960000038	20031	1	0	19,25	5,88000011
2	29.10.2017 19:44:12	19394	1,230000019	0	19,5550003	6,03000021	20434	1	0	19,6329994	5,960000038	20026	1	0	19,21899986	5,88000011
3	29.10.2017 19:45:12	19393	1,230000019	0	19,5389996	6,03000021	20433	1	0	19,6329994	5,960000038	20022	1	0	19,25799942	5,88000011
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																

- Optionally add column descriptions manually according to the logger program.



	A	B	C	D	E	F	G	H	I	J
1	Date und time	Counts sensor 1	Permittivity sensor 1	Water content sensor 1	Temperature sensor 1	Battery voltage sensor 1	Counts sensor 2	Permittivity sensor 2	Water content sensor 2	Temperature ser
2	29.10.2017 19:43:12	19396	1,230000019	0	19,54700089	6,03000021	20434	1	0	1
3	29.10.2017 19:44:12	19394	1,230000019	0	19,55500031	6,03000021	20434	1	0	19,632
4	29.10.2017 19:45:12	19393	1,230000019	0	19,53899956	6,03000021	20433	1	0	19,632
5										
6										
7										
8										
9										
10										
11										
12										
13										

3.7 Step 7: Wireless cellular logging with GSM (optional)

- Check cellphone availability with your mobile phone and the SIM card which is intended to be used.



The logger modem is a 2G (GSM) device. Please choose a network operator for your SIM card which supports 2G in your area.



Before operating the 2G modem be sure to attach an antenna to the antenna port.

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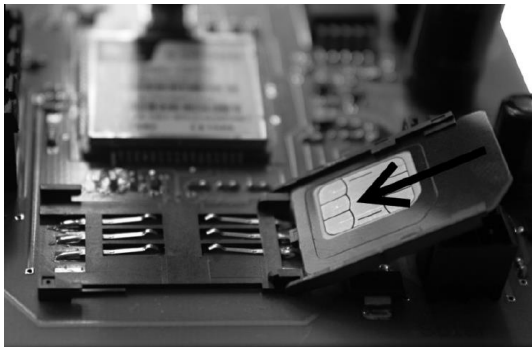
Note

It is recommended to verify that 2G (GSM) network coverage is at your location. Many network providers supply coverage maps online which are a good indication. With some SIM cards it is required to make an initial phone call to activate data transmission. This is required only once after buying the SIM card.

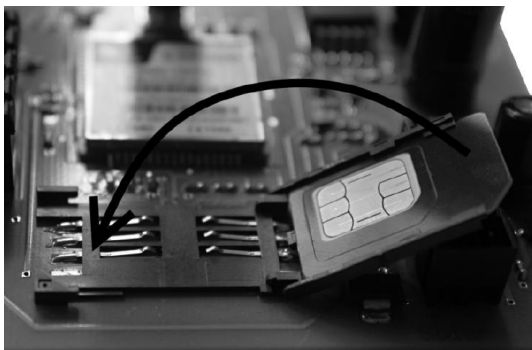
Note

The GSM modem in the logger draws up to 2 A current when transmitting. So if operation of the logger is intended with external power supplies check for suitable pulse power capability.

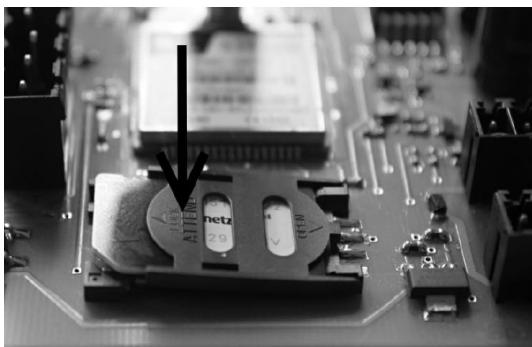
- Check SIM card for clean contact surfaces.
- Unplug battery connector and carefully insert the SIM card as shown in detail below.



Insert the SIM card into the SIM card holder.

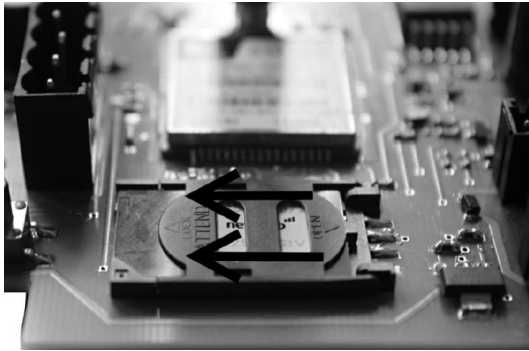


Fold down the SIM card in the SIM card holder.



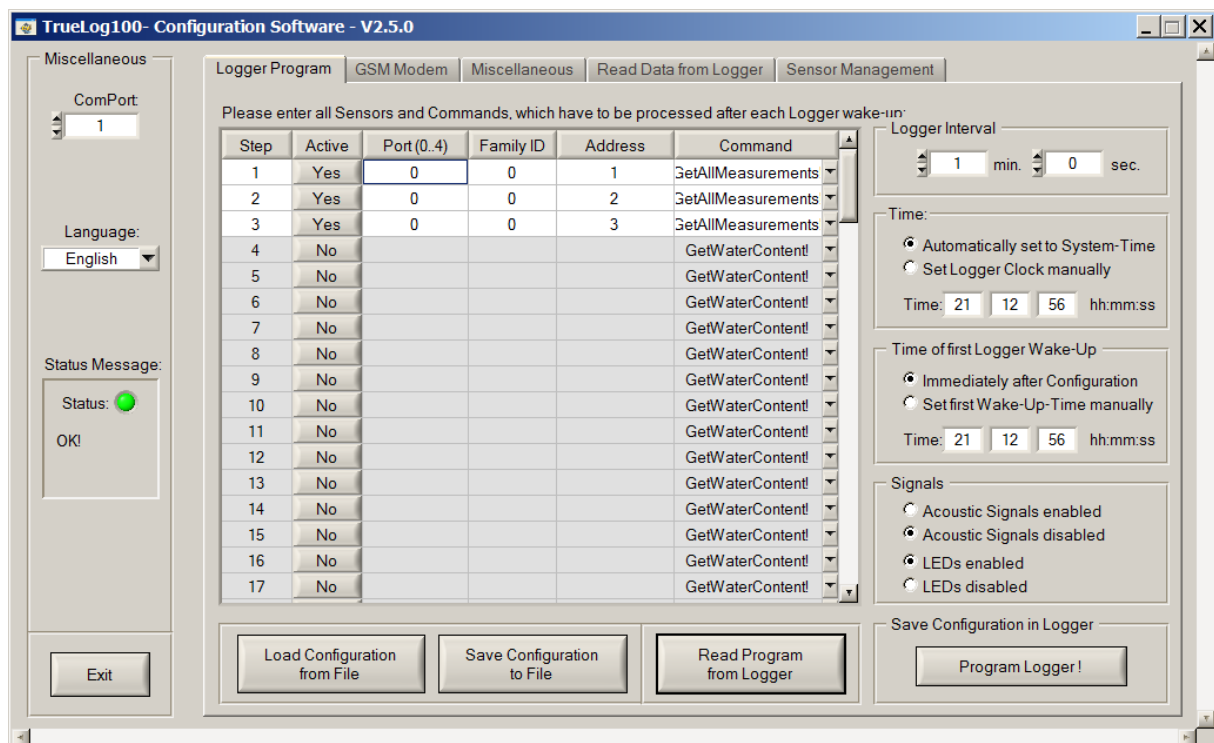
Push down the SIM card in the SIM card holder.

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Slide the cover in the direction of the arrow until it locks.

- Plug in the USB cable.
- Reconnect the battery connector to the logger baseboard.
- Load the desired configuration file or enter a logger program in the “Logger Program” tab.



- Switch to the “GSM Modem” tab and configure the logger for data transmission via a cellular network (GSM). Tick “GSM Modem” to apply and enable your individual settings.

Note

It is recommended to save the logger program in a configuration file. Both logger program and GSM settings are stored in the configuration file and can be retrieved later.

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TrueLog100 - Configuration Software - V2.5.0

Miscellaneous

ComPort: 1

Language: English

Status Message: Status: OK!

Exit

Logger Program GSM Modem Miscellaneous Read Data from Logger Sensor Management

☒ GSM Modem

SIM Card

PIN: 1234

APN: internet

USER:

PASSWORD:

FTP Server

FTP Server: myftpserver.org

FTPUN: myusername

FTP Password: mypassword

FTP Path: /

Modem Interval

Send data every 5 minutes

Station ID

Station ID: 1234

Read back GSM configuration from logger

Read GSM configuration from logger



It is of utmost importance to enter the correct PIN for the SIM card. After 3 tries with a wrong PIN it is necessary to unlock the SIM card with the PUK in a mobile phone again.

Note

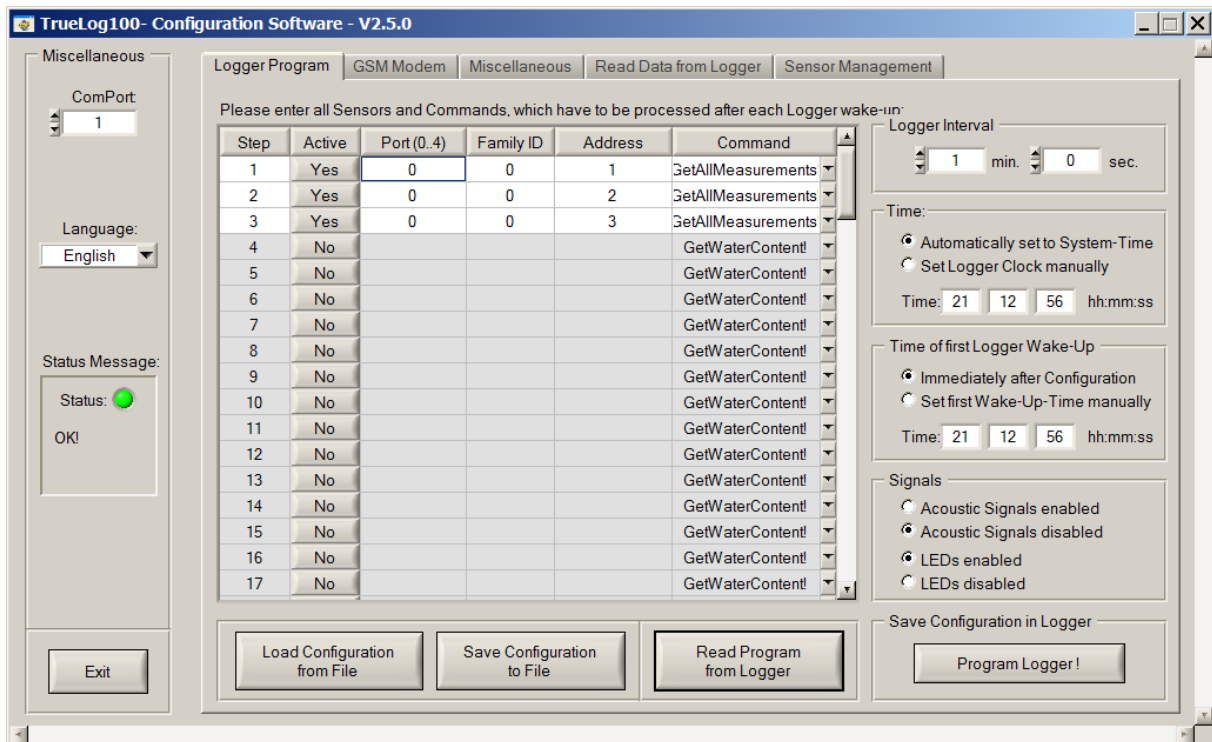
The FTP server has to be supplied by the customer. Please carefully check credentials and file path. Please also carefully check APN, USER and PASSWORD for internet access from your SIM card provider. Sometimes USER and PASSWORD entries are not required and the corresponding fields have to remain empty.

Note

The modem interval should be set for reasonable intervals. For limited time test purposes a 5 minute interval may be suitable. For later operation in the field typical intervals are a few hours. If the interval is shorter then battery life is less since each data transmission requires a lengthy network initialization. Battery life is strongly dependent on measurement and modem interval as well as type and number of sensors. Battery status can always be checked from the FTP files transmitted.

- Switch back to the tab “Logger Program” and program the logger by pressing “Program Logger!”

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- Verify GSM signal strength by pressing the **button 1** on the logger baseboard until the morse code “r” (short beep - long beep – short beep) is heard. Multiple signal strength measurements are performed and corresponding morse code sounds are heard. It may take a while until GSM signal is steady. The morse code summary for button 1 is:

Note

Button 1 morse code summary

- — ● r: confirms start of the signal strength measurement
- no signal
- very weak signal
- ● weak signal
- ● ● medium signal
- ● ● ● strong signal
- ● ● ● ● very strong signal

- Check data transmission to FTP server by pressing the **button 2** on the logger baseboard until the morse code “m” (long beep - long beep) is heard. Then the measurement starts. If the measurement is finished successfully then the morse code “r” (short beep - long beep – short beep) is heard. Then the data transmission starts. If the data transmission is finished successfully then the morse code of two times “r” (two times short beep - long beep – short beep) is heard. Any error is notified with 8 times a short beep and the whole operation is aborted.

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Note

Button 2 morse code summary

— —	m: confirms start of the sensor measurement
● — ●	r: confirms start of the data transmission
● — ● ● — ●	r r: data transmission successful
● ● ● ● ● ● ● ●	error

- Check data availability on the FTP server. Test measurements will appear on the FTP-server with filenames like this: Test_20171029210323_1234_170819152215.tru
- Unplug the USB cable to start normal logging and data transmission. Measurements will appear on the FTP server with filenames like this: 20171029214823_1234_170819152215.tru
- Investigate the content of the FTP files (see sample bellow).

1234,11,5.99

29.10.2017 21:44:23,19299,1.27,0.00,19.594,6.03,20159,1.00,0.00,20.039,5.96,19838,1.06,0.00,19.164,5.88

29.10.2017 21:45:23,19298,1.27,0.00,19.625,6.03,20160,1.00,0.00,20.102,5.96,19838,1.06,0.00,19.180,5.88

29.10.2017 21:46:23,19298,1.27,0.00,19.602,6.03,20161,1.00,0.00,20.109,5.96,19837,1.06,0.00,19.195,5.88

29.10.2017 21:47:23,19298,1.27,0.00,19.602,6.03,20161,1.00,0.00,20.086,5.96,19837,1.06,0.00,19.242,5.88

29.10.2017 21:48:23,19298,1.27,0.00,19.633,6.03,20161,1.00,0.00,20.109,5.96,19838,1.06,0.00,19.203,5.88

Checksum=26190

Note

The first line of the file provides essential housekeeping information

1234: Station id as entered in the GSM mode configuration

11: GSM signal strength (2-9: marginal, 10-14: ok, 15-19: good, 20-30: excellent)

5.99: Battery voltage (if voltage drops below 4.5 V replace batteries)

The last line provides a checksum which is calculated by summing up all bytes before "Checksum".