Service Tool

.MAP110

User Manual

Date: 12.10.2012
File name: D000011475 dotMAP110 User Manual en.docx

Revision history

Version	Date	Comments
a	28.02.2005	First edition
b	31.05.2005	Changes to release 1.1
c	22.09.2005	Changes to release 1.2
d	05.12.2006	Changes to release 2.2
e	14.12.2006	Field strength indication for GSM installation support changed
f	14.01.2010	Changes to release 3.3 New document number D000011475 replaces H 71 0200 0332 (version index continued)
g	29.01.2009	Changes to release 3.4
h	06.03.2010	Sections 1 "Overview" and 2 "Installation" updated. All communication surveys new with photos. All communication screenshots adapted to changed software. Designation "meter" generally replaced with "device". Section 5.8 "Command Tree" expanded with user command tree. Section 7.2.5 "Generating Export Files for MAP100" new. Section 7.3.2 "Firmware Update AD-xP/xG" new. Section 7.5.6 "Setting MAP100 File Export" new. Section 7.5.7 "Checking for Updates" new. Section 10 "Short Description of Device Security System" updated Several minor changes (text, layout, screenshots, index).
k	20.12.2010	Changes to .MAP110 release 4.0
m	12.01.2011	Adaptation to tool changes: progress bar no longer in status bar, command tree command name changes, several minor changes (text, layout, screenshots).
n	30.05.2011	Changes to .MAP110 release 4.1
p	02.11.2011	Changes to .MAP110 release 4.2
q	02.03.2012	Changes to .MAP110 release 4.3
r	21.05.2012	Changes to .MAP110 release 4.4; New Licensing.
s	12.10.2012	Changes to .MAP110 release 4.5; New command tree structure with generic and device specific commands; Time base selection for profile readout for devices supporting this feature.

Introduction

Scope

The present user manual is designed for the Landis+Gyr .MAP110 Service Tool **Version 4.5** and higher.

Purpose

This user manual contains all information required for the use of the Landis+Gyr .MAP110 Service Tool. It not only provides explanations concerning functionality and general procedures, but also gives detailed, illustrated instructions on how to use the software.

Target group

The contents of this user manual are intended for technically qualified personnel of energy supply companies responsible for service tasks (installation, readout and maintenance) for Landis+Gyr devices.

Conditions

The Landis+Gyr .MAP110 Service Tool runs on PCs with Windows operating system. To understand this user manual, you need basic knowledge of Windows and its terms, as well as a general idea of how to operate a PC. Furthermore, you need to be familiar with the functional principles of the various devices supported by the Landis+Gyr .MAP110 Service Tool, which are described in the corresponding user manuals and functional specifications.

Conventions

The following conventions are used in this manual:

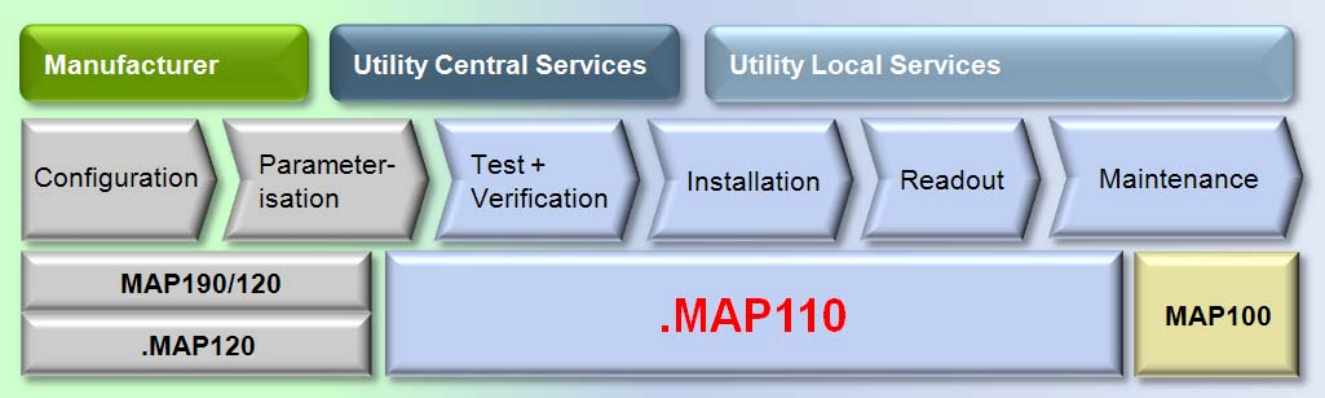
1. 2. 3.	Ordinal numbers are used for individual steps in the instructions.
Extra	Buttons, menu names and individual menu items appear in bold text.
[F1]	Keys are shown in square brackets.
[Ctrl]+[V]	Key combinations are shown with a plus sign (e.g. [Ctrl] key kept pressed while pressing [V] key)
"Options"	Names of windows and elements appear in quotation marks.

Table of contents

1 Overview

The Landis+Gyr .MAP110 Service Tool supports services needed to install Landis+Gyr devices (meters, communication modules and communication units), to read billing and diagnostic values and to perform maintenance operations.

The following diagram illustrates the various fields of application of the Landis+Gyr .MAP Tools.



1.1 Functions

The Landis+Gyr .MAP110 Service Tool supports the following range of functions:

- **Installation:**
  setting of clock and ID numbers, reset of registers and profiles, communication test functions, vector diagram, primary data adaptation
- **Reading of data:**
  billing values, diagnostic values, profiles, export data
- **Maintenance:**
  readout and modification of time of use, of all communication parameters or of selected parameters (e.g. various thresholds), visualization of the security system, firmware update

1.2 Communication Channels

The Landis+Gyr .MAP110 Service Tool can communicate with the devices via the following communication channels:

- **Serial:** Optical reading head, Bluetooth reading head, RS232, RS485, CS, M-Bus
- **Modem:** PSTN, GSM
- **Network:** GPRS, Ethernet

1.3 Communication Protocols

The Landis+Gyr .MAP110 Service Tool supports the following communication protocols:

- dlms / HDLC
- dlms / COSEM Wrapper over TCP
- IEC 62056-21 (formerly known as IEC 1107)

1.4 Editions

To ensure the maximum possible flexibility for users of the Landis+Gyr .MAP110 Service Tool, the software can be licensed for various user groups with different functionality:

- Standard (full functionality, currently the same as Certification)
- Certification (certification authority)
- Engineering (laboratory use)
- Installation (field use)
- Reader (local and remote)
- Field Inspection (installation check)
- Consumer (final customer)

The edition is determined by the licence data (see section 3 "Licensing").

Detailed information on the functions which can be performed by the user groups can be found in section 12 "Functional Range per User Group").

2 Installation

This section describes the installation of the Landis+Gyr .MAP110 Service Tool on the hard disk of your PC.

System requirements

To be able to run the Landis+Gyr .MAP110 Service Tool, your PC must be equipped with the operating system Windows XP, Windows Vista or Windows 7.

For 64 bit operating systems, special 64 bit hardware drivers (e.g. optical head) are necessary, 32 bit drivers don't work! Landis+Gyr does not deliver any hardware drivers, since we are not producing/selling these products.

Additionally, the following system components, which are not part of the Landis+Gyr .MAP110 Service Tool, must be installed on your PC:

- .NET Framework Version 4.0
- MS Excel 2003 or higher (for enhanced diagnostic functions)

Administrator privileges

Administrator privileges on your computer are required for the installation and the licensing.

Installation software

The installation software for the Landis+Gyr .MAP110 Service Tool can be downloaded to your PC via the Internet from the homepage www.landisgyr.com. Please contact your sales representative to receive the required username and password for the download.

Preparation

Please read the file "Readme.txt" with current information about the present version of the Landis+Gyr .MAP110 Service Tool.

First installation

Start the installation file "Setup.exe" and then follow the instructions of the setup wizard.

Upgrades

Close the Landis+Gyr .MAP110 Service Tool, if it is in use. Then start the installation file "Setup.exe" and follow the instructions of the setup wizard.

When **upgrading a former version 4.5** to the latest version 4.5, the former version will be automatically replaced by the newer one. All data including the license and the communication profiles is kept.

When **upgrading a former version 4.0, 4.1, 4.2, 4.3 or 4.4** to the latest version 4.5, the new version can be installed in parallel to a former version in a separate directory. All data including the license is kept.

When **upgrading a former version 3.x** to the latest version 4.5, the new version can be installed in parallel to a former version in a separate directory. The license is kept but the communication profiles are lost and must be entered again. However, it is possible to import the phone book of a former version. Use the import function in the new address book for this (see section 6.3.4 "Defining Address Data").

Former versions 1.x and 2.x can't be upgraded.

Landis+Gyr recommend to remove older versions since they will no longer be supported.

Language

The required language must be selected at installation time. It can be changed again at any time in the Landis+Gyr .MAP110 Service Tool.

3 Licensing

This section explains the licensing concept and describes the steps necessary for licensing the Landis+Gyr .MAP110 Service Tool.

3.1 Licensing Concept

After installation, the Landis+Gyr .MAP110 Service Tool is in the unlicensed state, i.e. it can only be used as demo version with reduced range of functions. In order to permit the use of the Landis+Gyr .MAP110 Service Tool without restrictions, it must be licensed for the intended use (available editions see section 1.4 "Editions"). For this purpose, the following licensing data can be obtained from the Landis+Gyr representative responsible, which must be entered in the Landis+Gyr .MAP110 Service Tool:

- User Name
- User Group
- License Key

The procedure is described in section 3.2 "Entering License Data".

MAP110 licence key remains valid for .MAP110
The license key for the former Landis+Gyr MAP110 Service Tool is also valid for the Landis+Gyr .MAP110 Service Tool. If MAP110 is already installed on the computer, the license will be automatically imported into .MAP110.

The license of the Landis+Gyr .MAP110 Service Tool version 4.4 or higher is handled individually per Windows user and per .MAP110 main version on a single PC. If several persons share the same PC, the required .MAP110 user group with its specific functionality can therefore be individually assigned to each Windows user (with former versions the same license was used for all Windows users of a single PC and all .MAP110 versions).

When upgrading a former MAP110 version 3.x or .MAP110 version 4.0, 4.1, 4.2 or 4.3 to version 4.4 or higher the current license is kept, i.e. it is copied once for each Windows user of the PC from the former version.

From version 4.4 any license change or a new license only affects the current Windows user and the current .MAP110 main version.

The license conditions remain unchanged, i.e. all existing and new licenses can be further used by one or several Windows users on one or several PCs. Please note, that normally the user name in the .MAP110 licence and the Windows user name are different. The user name in the .MAP110 licence is usually the name of the person that applied for the licence.

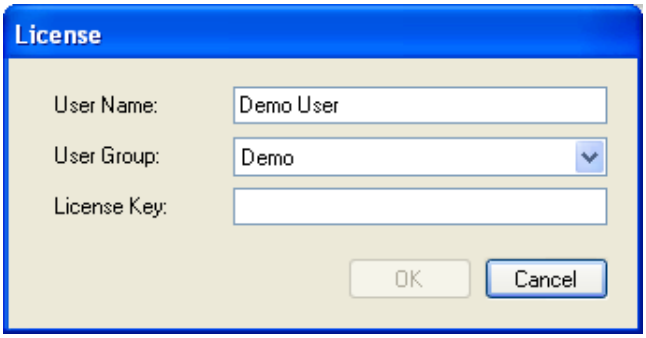
3.2 Entering License Data

This section describes the licensing procedure required for unrestricted use of the Landis+Gyr .MAP110 Service Tool. The license data received from Landis+Gyr following your order is required for this purpose.

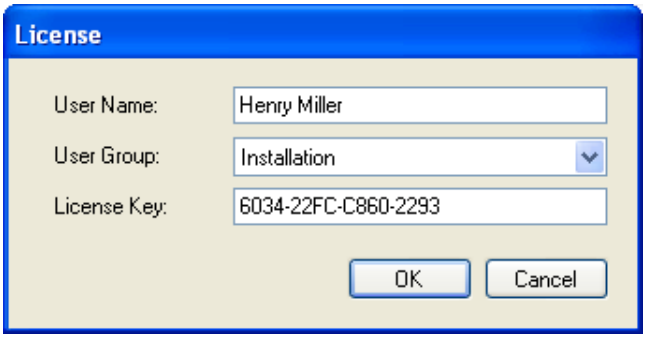
Administrator privileges required
Administrator privileges on your computer are required for the licensing. Under Windows 7 you can achieve this by right clicking on the start command and then selecting the entry "Run as administrator" in the popup menu appearing.

Procedure:

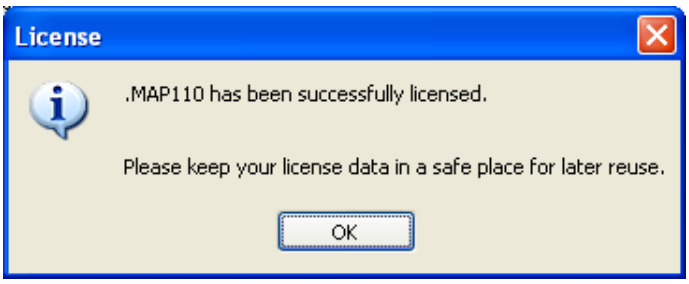
1. Click on **Start** and then under **Programs** select the **Landis+Gyr .MAP110** command from the menu **Landis+Gyr .MAP110 4.5** in the **Landis+Gyr** program group.
   The Landis+Gyr .MAP110 Service Tool is started.
2. Select **License** from the **Tools** menu.
   The "License" window appears.



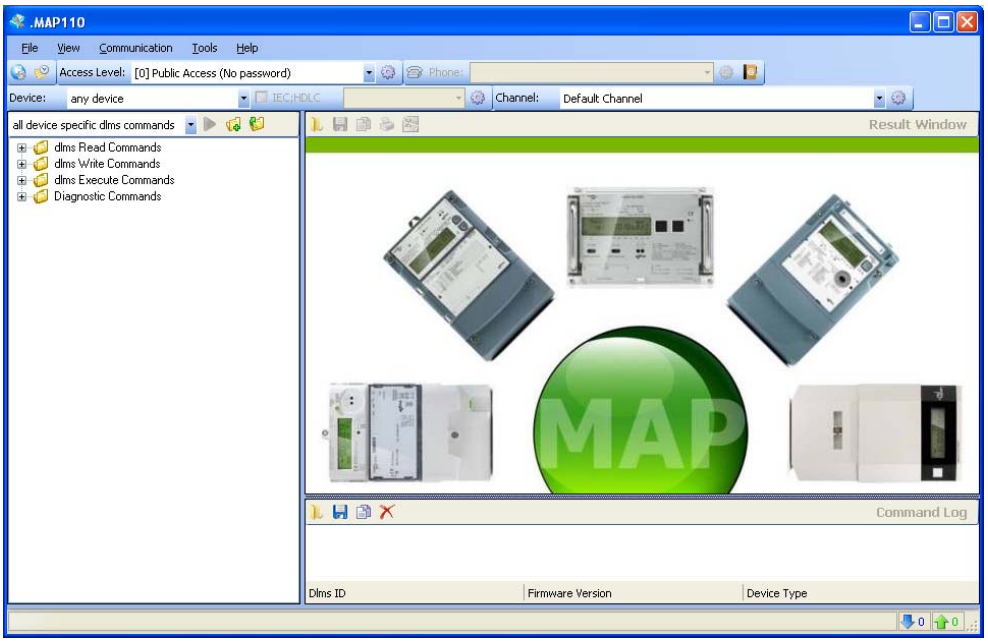
3. Enter the user name provided by Landis+Gyr in the "User Name" entry box.
4. Select the user group provided by Landis+Gyr in the "User Group" selection field.
5. Enter the licence key provided by Landis+Gyr in the "License Key" entry box.



6. Click on **OK**.
   The licence data is checked and a success message is displayed.



7. Click on **OK**.
   The licensing procedure is terminated. The accessible commands or device types, respectively, can be selected in the selection box above the command tree and the available commands are displayed in the command tree.



The Landis+Gyr .MAP110 Service Tool is now ready for use according to the instructions given in sections 4 "First Steps" or 7 "Application of .MAP110 Functions", respectively.

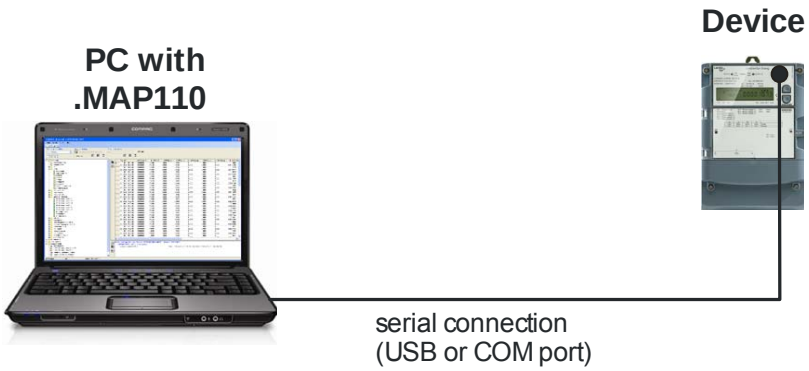
Keep the license key in a safe place
Please note that due to security reasons the license key is not shown anymore if the "License" window is reopened. Keep the license key in a safe place for further use.

3.3 Changing the License

The license can be changed by requesting new license data from Landis+Gyr and entering this in the "License" window (see section 3.2 "Entering License Data").

4 First Steps

This section gives an introductory example of how a communication connection is made to a device with the Landis+Gyr .MAP110 Service Tool and how data can be read from the device.

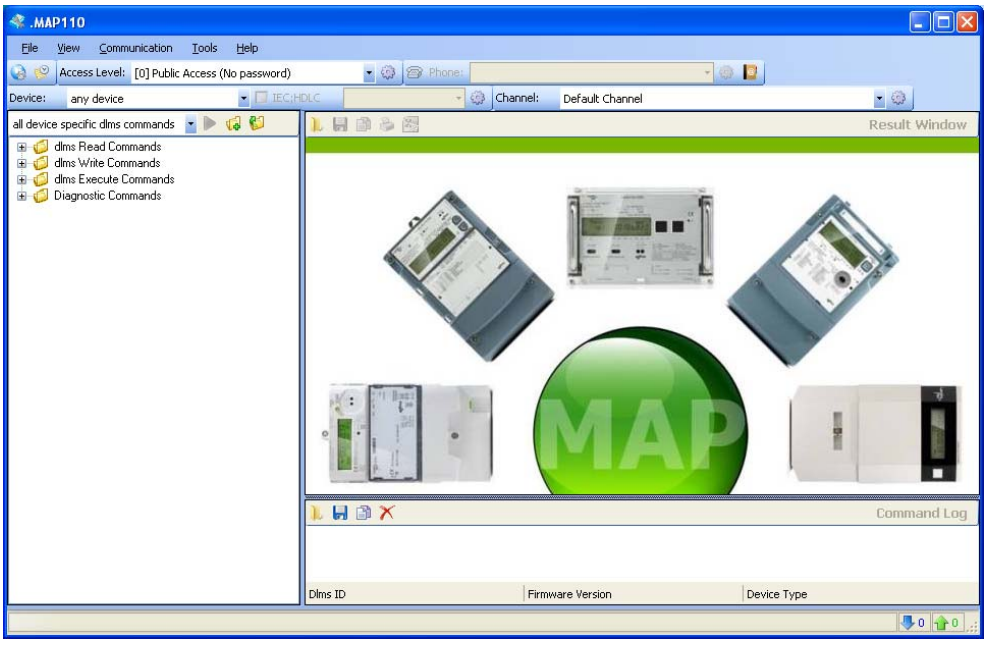


A device ready for operation and an optical reading head for connection to a serial interface (USB or COM port) are required for this purpose. The Landis+Gyr .MAP110 Service Tool must also be installed on the PC and licensed, e.g. for user group "Installation".

Default channel is COM1
Please note that the default channel is COM1. If your optical head is connected to another COM port, the readout fails unless you adapt the channel setting accordingly (see section 6.3 "Communication Settings").

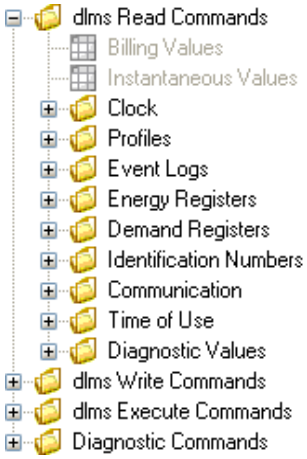
Procedure:

1. Connect the cable of the optical reading head fitted on the device to the serial interface of the PC.
2. Click on **Start** and then under **Programs** select the **Landis+Gyr .MAP110** command from the menu **Landis+Gyr .MAP110 4.5** in the **Landis+Gyr** program group.
   The Landis+Gyr .MAP110 Service Tool is started.



3. In the selection box above the command tree select either the entry "all dlms commands" or the device type (family) connected.

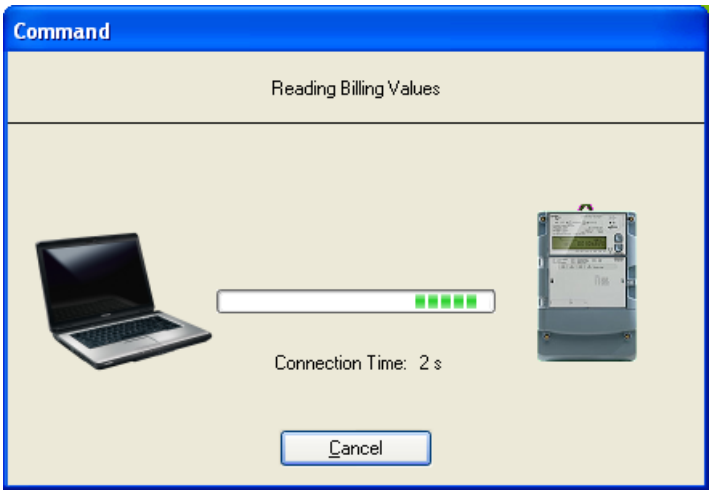
4. Open the "dlms Read Commands" folder in the command tree.
   For this purpose click the symbol ⊞ before the "dlms Read Commands" folder or double-click on the folder symbol .
   The available commands for the selected device type are displayed:



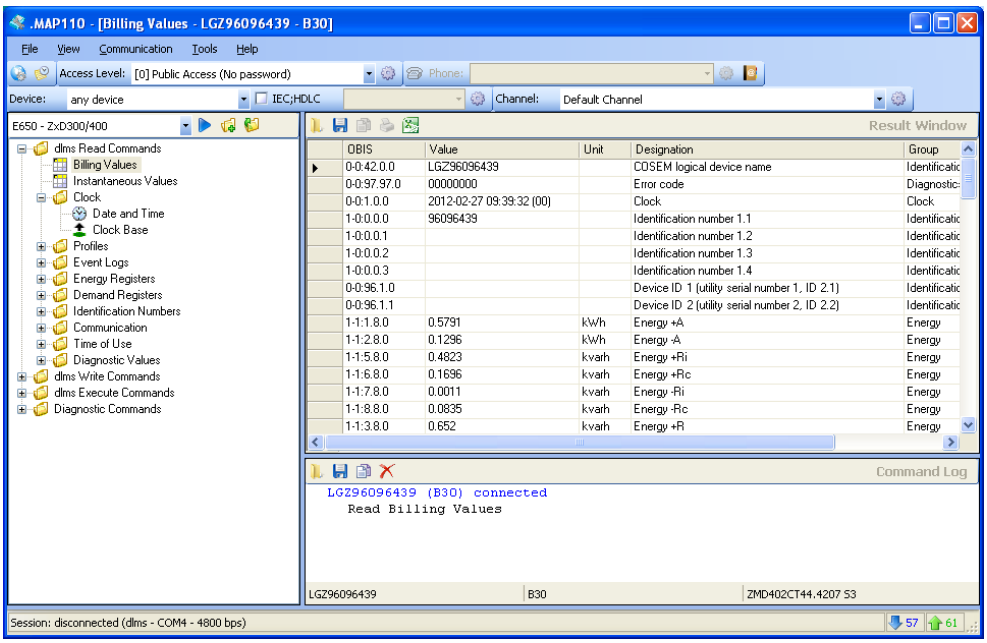
5. Mark the "Billing Values" command in the command tree under "dlms Read Commands" by clicking it.

6. Click on the button above the command tree to execute the "Billing Values" command.

   Communication begins after selecting the command and the device data are read from the device connected. During this process, which can take several minutes depending on the number of items to be read, the "Command" window is displayed.



   After completing the readout the device data is displayed in the display area of the Landis+Gyr .MAP110 Service Tool.



7. Examine the data read out in the table in the display area.

   By clicking  the data read out can be saved in an XML or text file.

   By clicking  the data read out can be transferred to the Microsoft Excel table calculation program.

This concludes the introductory example. Further instructions with more detailed explanations are provided in the following sections.

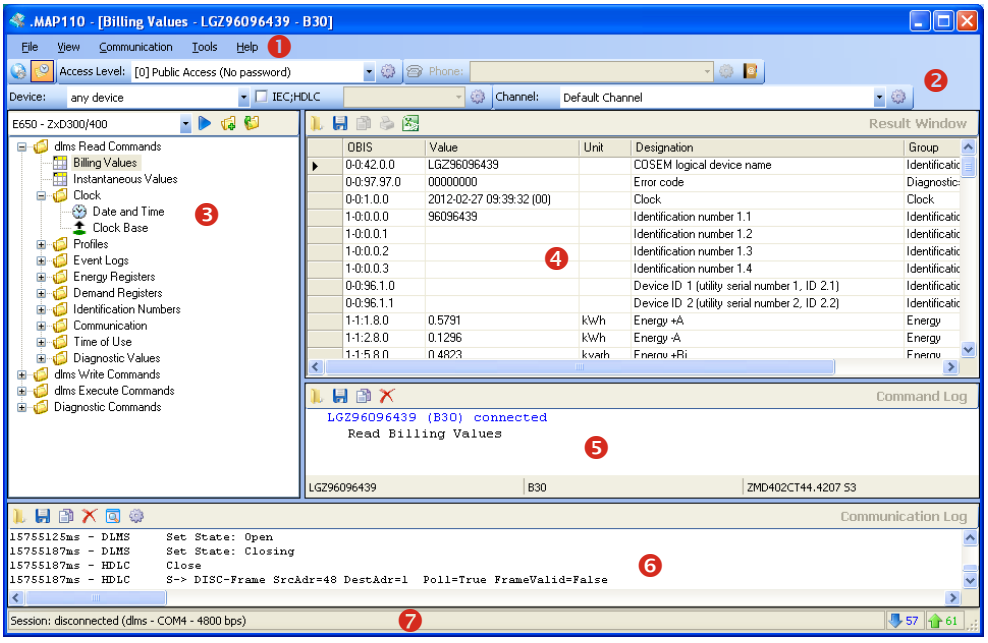
5 Description of User Interface

This section describes the user interface of the Landis+Gyr .MAP110 Service Tool.

5.1 Overview

The user interface of the Landis+Gyr .MAP110 Service Tool comprises the following areas:

- Menu bar (1) with the "File", "View", "Communication", "Tools" and "Help" menus to select functions.
- Toolbars (2):
  - Application toolbar
  - Access level toolbar
  - Address toolbar (either phone number or IP address is visible)
  - Device toolbar
  - Communication channel toolbar
- Command tree (3)
- Result window (4)
- Command log (5) for recording events, results, error messages, etc.
- Communication log (6) for recording and analysing communication activities
- Status bar (7) for displaying characteristic data of the device connected.



The sizes of the areas for the command tree, result window and command log window can be set individually with the movable separator situated in between (click separator and move with mouse button pressed).

The items in the selection area can be arranged individually by moving to another position (click dotted line and move with mouse button pressed).

The status bar and the communication log can be faded in or out using the menu points of the "View" menu.

5.2 Menu Bar

The menu bar of the Landis+Gyr .MAP110 Service Tool contains the following menus for selecting functions:

- **File** menu for saving result or log window data, for opening data saved in the result or log windows and for ending the application.
- **View** menu to fade in or out the status bar and the communication log.
- **Communication** menu to connect and disconnect devices and to make communication settings.
- **Tools** menu to select functions for licensing, startup language setting and option setting.
- **Help** menu to select online help, release notes and version display and to check for available updates.

5.3 Toolbars

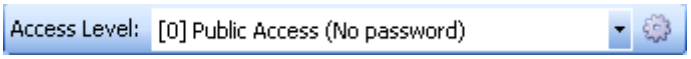
5.3.1 Application Toolbar

The application toolbar contains the following buttons for direct selection of functions frequently required:

 opens the communication settings window

 fades the command log window in or out

5.3.2 Access Level Toolbar

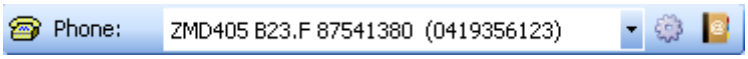


The access level toolbar allows selection of the required access level. Only fully defined access levels are displayed, a level can occur more than once with different settings.

Clicking on  in the access level toolbar displays the access level settings (see section 6.3.6 "Defining Access Levels").

5.3.3 Address Toolbar

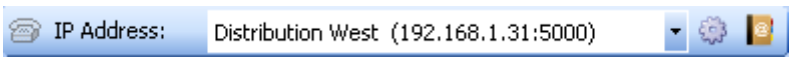
The phone number or IP address selection boxes displayed depending on the communication settings allow selection of the corresponding entry in the address book.



The phone number of the required modem can be selected in the "Phone" selection box if a modem is selected as communication channel.

Clicking on  in the address toolbar makes the connection to the selected phone number. When the connection is made, the selection box is blocked and the symbol on the button changes its appearance.

Clicking on  in the address toolbar interrupts the modem connection.



The IP address and port number of the required device can be selected in the "IP Address" selection box, provided a network card is selected as interface in the communication profile settings. The phone symbol is de-activated.

Clicking on  in the address toolbar displays the selected address definition in the "Address Book" window, where it can be modified.

Clicking on  in the address toolbar displays the address book (see section 6.3.4 "Defining Address Data").

5.3.4 Device Toolbar

The device toolbar allows the selection of devices with predefined settings (device family and device addresses).

With the checkbox "IEC;HDLC" you can deactivate and again activate the device address and in the selection box you can select all defined device addresses.

Clicking on  in the device toolbar displays the device settings (see section 6.3.2 "Defining Device Data").

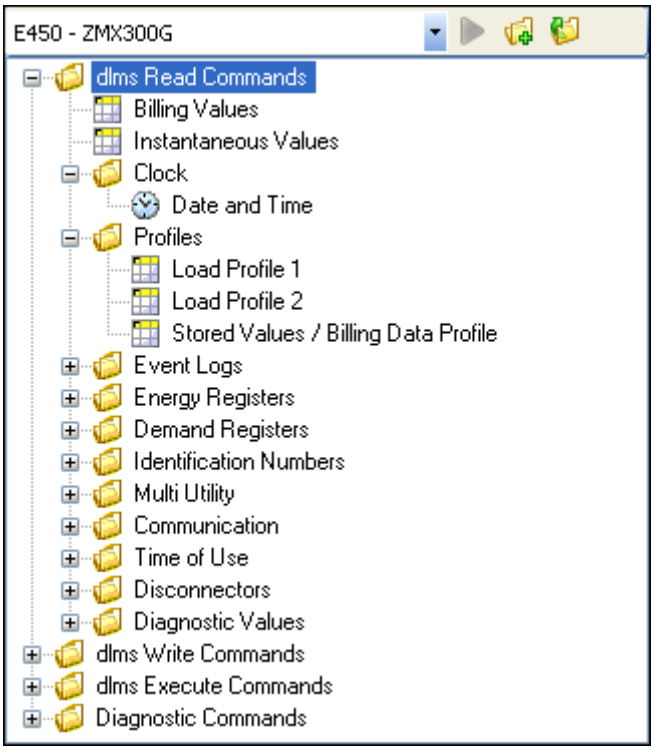
5.3.5 Communication Channel Toolbar

The communication channel toolbar allows the selection of communication channels with predefined settings (e.g. interface, transmission protocols etc.).

Clicking on  in the communication channel toolbar displays the channel settings (see section 6.3.3 "Defining Communication Channel Data").

5.4 Command Tree Window

All available commands for the licensed user group are displayed in a tree view corresponding to the device selected in the selection box on the top left side of the window. Instead of a specific device, selection of all IEC commands or of all dlms commands is also possible.



Instead of a specific device type it is also possible to choose one of the following command groups in the command tree:

- all generic dlms commands
- all device specific dlms commands
- all generic IEC commands
- all device specific IEC commands

Generic commands work with all devices, with new, not yet supported Landis+Gyr devices as well as with devices of other manufacturers. There are only few generic dlms commands available but many generic IEC commands.

Device specific commands only work with Landis+Gyr devices supporting the corresponding command. All commands not available for the connected device are marked in colour in the command tree (see paragraph "Display of disabled commands in the command tree".

When selecting a device in the device toolbar the command tree is automatically switched to the corresponding device type.

Toolbar

The toolbar of the command tree window contains the following buttons:

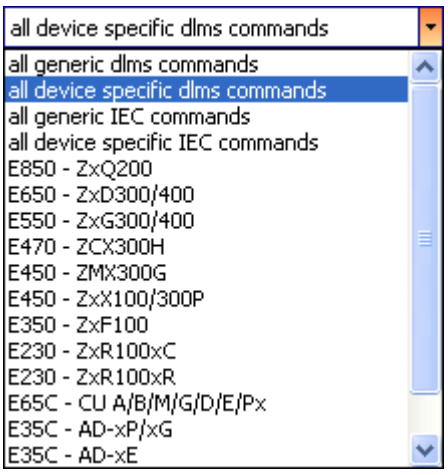
 Executes the selected command of the tree

 Expands all folders of the tree

 Collapses all folders of the tree

Selection field

In the selection field of the command tree it is possible to choose command sets for all supported Landis+Gyr devices and also the generic and device specific command groups described above:



Tree view

A tree view, e.g. as generally familiar from the file system tree of Windows Explorer, is ideally suited for navigating in ordered structures with folders and subfolders.

Tree items

For the Landis+Gyr .MAP110 Service Tool the command tree consists of a hierarchic arrangement of tree items (folders and commands).

Tree items are shown as follows:

- Folders
- Read commands for values (device values, profiles, etc.)
- Read or write commands for date and time
- Read commands for parameters (e.g. read identification number)
- Write commands for parameters (e.g. write identification number)
- Execute commands (e.g. reset register)
- Excel evaluation (e.g. load profile analysis)
- GSM installation support
- Vector diagram
- DIP table
- Emergency readout

Folder handling

Each folder can be expanded and collapsed individually.

Collapsed folder items are preceded by an expansion sign ⊞, expanded folder items by a collapse sign ⊟.

Use the buttons  or  of the command tree window toolbar to expand or collapse all folders. Clicking the right mouse button inside the command tree window and then selecting the "Expand all" or "Collapse all" entry in the pop-up menu appearing has the same effect.

To expand or collapse individual folders there are the following possibilities:

Using the mouse:

- Clicking on the expansion sign ⊞ of a folder expands this folder (the expansion sign changes to a collapse sign ⊟).
- Clicking on the collapse sign ⊟ of a folder collapses this folder (the collapse sign changes to an expansion sign ⊞).
- The relevant folder is opened or closed by double-clicking or the text following.

Using the keyboard:

- Pressing the **[*] key** of the numerical keyboard expands the whole tree below the selected folder (i.e. all subfolders and commands will be visible).
- Pressing the **[+] or [–] key** of the numerical keyboard toggles between the expanded and collapsed tree view.

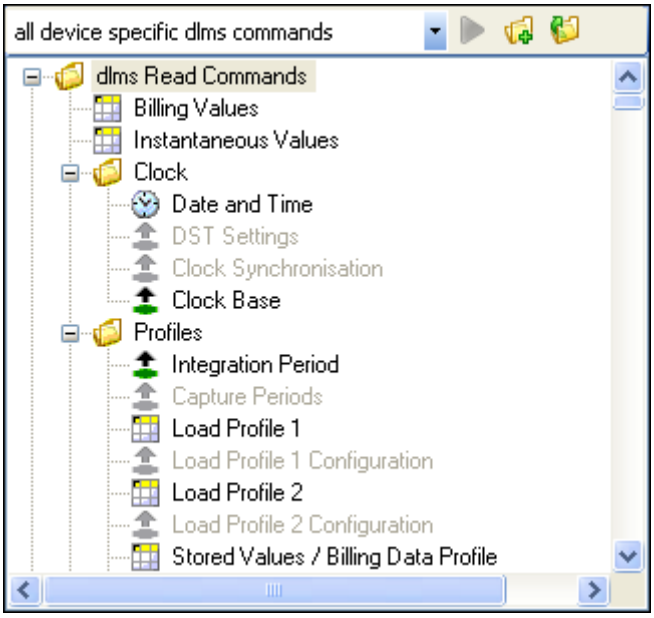
Command execution

A command can be executed in various ways:

- double-clicking on the command or
- marking the command by clicking and then clicking on the button of the command tree window toolbar or
- clicking the right mouse button on the command and then selecting the "Execute selected command" entry in the pop-up menu appearing.

Display of disabled commands in the command tree

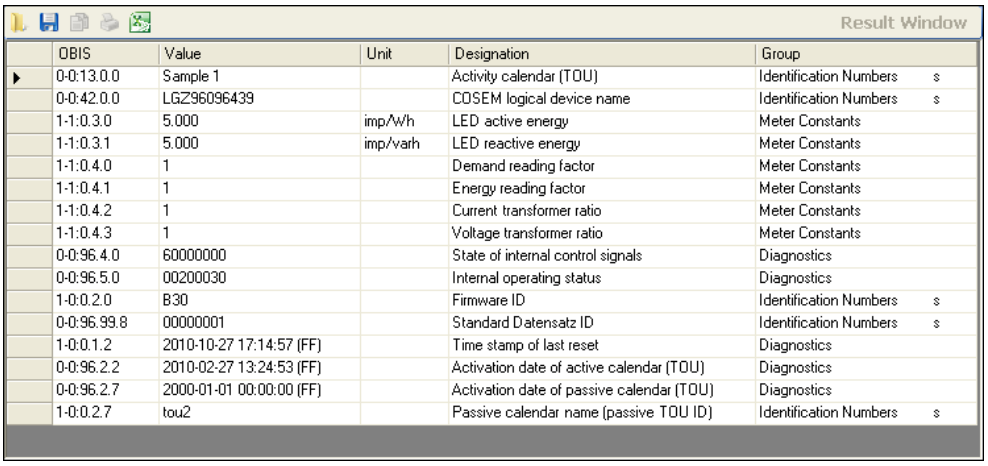
All commands not available in the connected device are marked in colour (grey in the example below) in the command tree. The identification colour can be set under **Options** in the **Tools** menu (see section 7.5.4 "Setting Colour for Disabled Commands").



If there is no connection to a device, all commands are shown unavailable. The commands can be selected, however, e.g. read out a value. Once a connection to the meter has been set up, the commands available are then displayed correctly corresponding to the connected device.

5.5 Result Window

Readout results (device values, profiles, etc.) are shown in tabular form or as graphic evaluation (e.g. DIP table) in the result window. The following example shows current device values.



	OBIS	Value	Unit	Designation	Group	
▶	0-0:13.0.0	Sample 1		Activity calendar (TOU)	Identification Numbers	s
	0-0:42.0.0	LGZ96096439		COSEM logical device name	Identification Numbers	s
	1-1:0.3.0	5.000	imp/Wh	LED active energy	Meter Constants	
	1-1:0.3.1	5.000	imp/varh	LED reactive energy	Meter Constants	
	1-1:0.4.0	1		Demand reading factor	Meter Constants	
	1-1:0.4.1	1		Energy reading factor	Meter Constants	
	1-1:0.4.2	1		Current transformer ratio	Meter Constants	
	1-1:0.4.3	1		Voltage transformer ratio	Meter Constants	
	0-0:96.4.0	60000000		State of internal control signals	Diagnostics	
	0-0:96.5.0	00200030		Internal operating status	Diagnostics	
	1-0:0.2.0	B30		Firmware ID	Identification Numbers	s
	0-0:96.99.8	00000001		Standard Datensatz ID	Identification Numbers	s
	1-0:0.1.2	2010-10-27 17:14:57 (FF)		Time stamp of last reset	Diagnostics	
	0-0:96.2.2	2010-02-27 13:24:53 (FF)		Activation date of active calendar (TOU)	Diagnostics	
	0-0:96.2.7	2000-01-01 00:00:00 (FF)		Activation date of passive calendar (TOU)	Diagnostics	
	1-0:0.2.7	tou2		Passive calendar name (passive TOU ID)	Identification Numbers	s

The data can either be displayed by readout from a device with the corresponding command or by opening a previously saved file.

The column widths of tables can be changed with the mouse (click edge of column and move while holding down the mouse button).

Clicking on  in the result window toolbar opens the "Open Result File" dialogue window to display result files previously saved again in the result window.

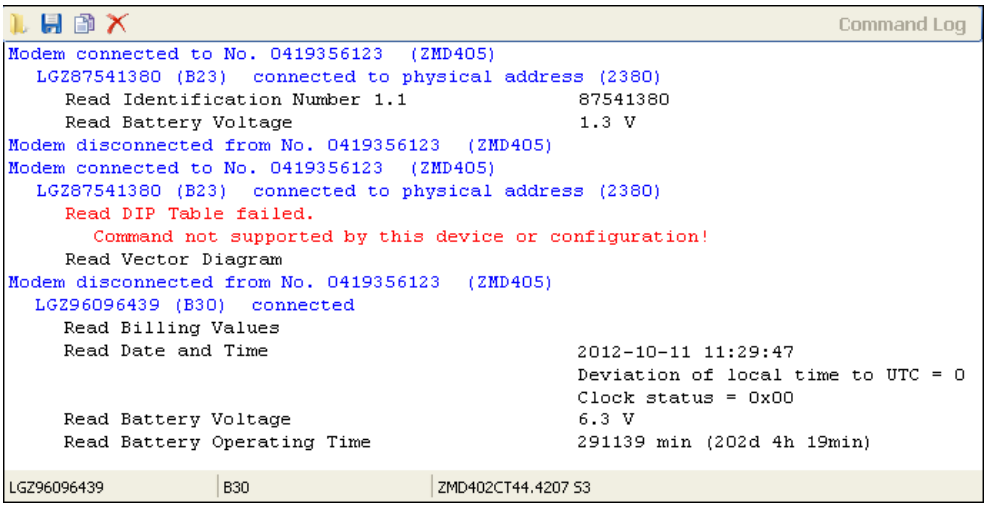
Clicking on  in the result window toolbar opens the "Save as" dialogue window to save the data displayed in a freely selected directory either as XML file (default) or as text file. Clicking the right mouse button in the result window followed by selection of the **Save as** menu item in the pop-up menu appearing has the same effect.

Clicking on  in the result window toolbar exports the data displayed for any desired further processing in the Excel table calculation program. Clicking the right mouse button in the result window followed by selection of the **Open with Excel** menu item in the pop-up menu appearing has the same effect.

Provided no data is yet shown in the result window, e.g. after starting the Landis+Gyr .MAP110 Service Tool, the following background picture can be seen in the result window.

5.6 Command Log

In the command log window, all activities are logged.



This includes connection messages (blue), command execution messages (black) and error messages (red).

For the command execution messages the result is displayed immediately afterwards if it is not displayed as a table in the result window (e.g. readout of current values) or as evaluation in its own window (e.g. vector diagram).

Clicking on  in the command log toolbar opens the "Open Command Log" dialogue window to display protocols previously saved again in the command log window. Clicking the right mouse button in the command log window followed by selection of the **Open** menu item in the pop-up menu appearing has the same effect.

Clicking on  in the command log toolbar opens the "Save as" dialogue window to save the log displayed in a freely selected directory either as RTF file (default) or as text file. Clicking the right mouse button in the command log window followed by selection of the **Save as** menu item in the pop-up menu appearing has the same effect.

Clicking on  in the command log toolbar copies the content of the command log window to the Windows clipboard, from where it can be inserted into another application (e.g. in a word processing program). Clicking the right mouse button in the command log window followed by selection of the **Copy all** menu item in the pop-up menu appearing has the same effect.

Clicking on  in the command log toolbar deletes the command log. Clicking the right mouse button in the command log window followed by selection of the **Clear** menu item in the pop-up menu appearing has the same effect.

The contents of the command log window can be processed as required, e.g. by inserting comments, deletion of individual points, marking of points and copying these with [Ctrl]+[C] to the Windows clipboard, etc.

By selecting the **Open** entry in the **File** menu protocols previously saved can be displayed again in the command log window.

The following device data is displayed in the status bar of the command log window as soon as a connection is made to the device and at least one command has been executed:

- Logical device name (left)
- Software identification (centre)
- Device configuration (hard and software) (right)

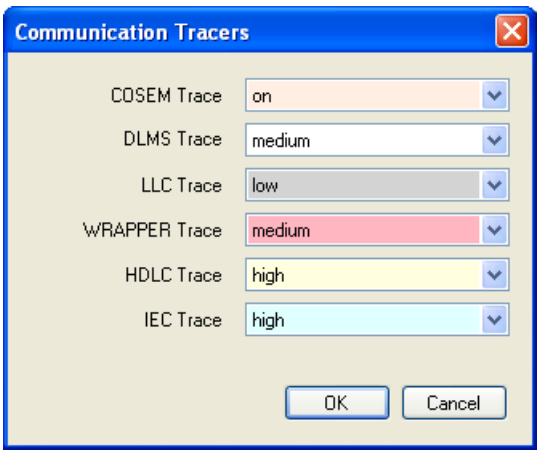
5.7 Communication Log

Additional knowledge required
Additional knowledge is required to analyze communication activities.

Clicking on  in the application toolbar shows or hides the communication log window, where all communication activities can be traced and analysed.

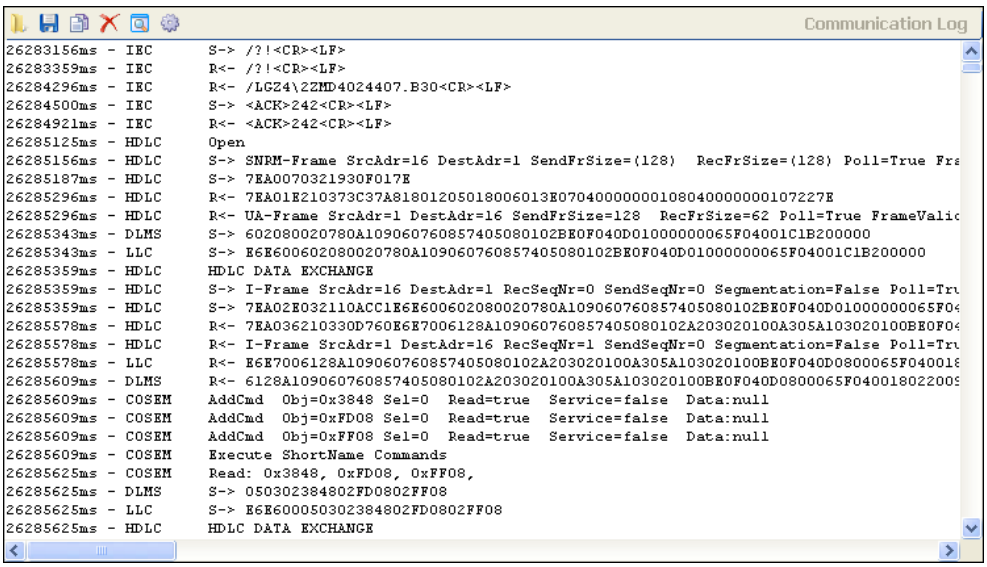
First, the trace level has to be adjusted for each trace type supported as follows:

1. Click on  in the communication log toolbar.
   The "Communication Tracers" window appears.

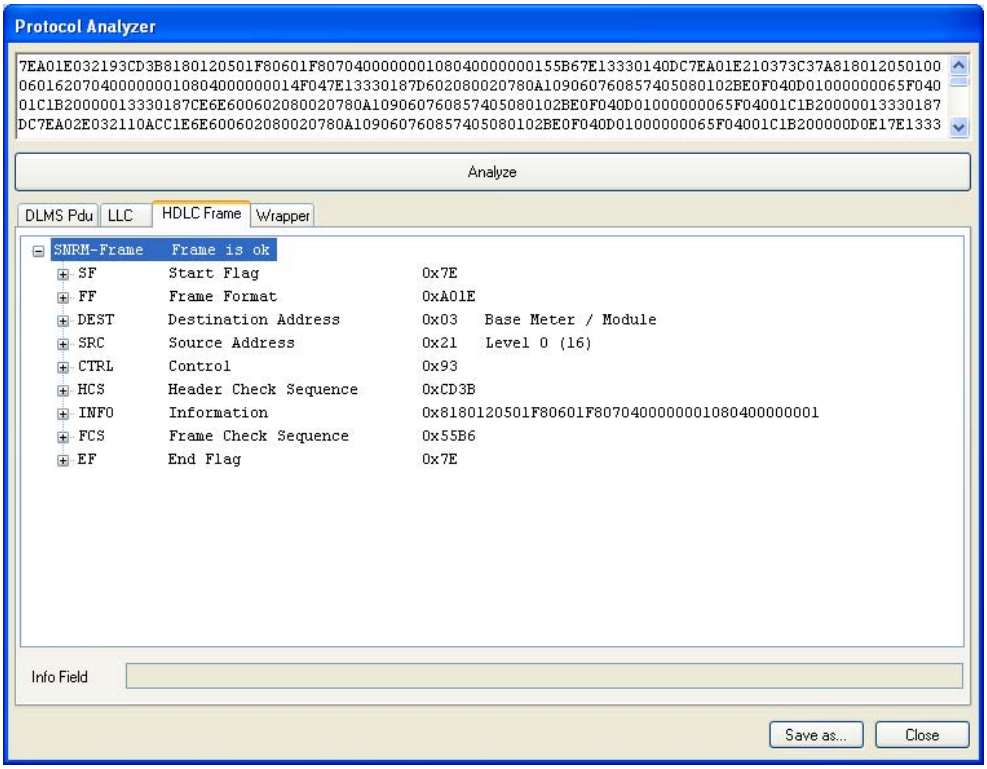


2. Select in the "COSEM Trace" selection field whether the COSEM Trace shall be on or off.
3. Select in the other selection fields the resolution of the DLMS, LCC, WRAPPER, HDLC and IEC tracers (low, medium, high) or switch them off.
4. Click on **OK**.

All communication activities are traced in the communication log according to the settings made.



To analyse a specific string, mark it and click on in the communication log toolbar. This opens the "Protocol Analyzer" window.



Clicking on in the communication log toolbar opens the "Open Communication Log" dialogue window to display logs previously saved again in the communication log window. Clicking the right mouse button in the communication log window followed by selection of the **Open Log File** menu item in the pop-up menu appearing has the same effect.

Clicking on in the communication log toolbar opens the "Save as" dialogue window to save the log displayed in a freely selected directory either as RTF file (default) or as text file. Clicking the right mouse button in the communication log window followed by selection of the **Save as** menu item in the pop-up menu appearing has the same effect.

Clicking on  in the communication log toolbar copies the content of the communication log window to the Windows clipboard, from where it can be inserted into another application (e.g. in a word processing program). Clicking the right mouse button in the command log window followed by selection of the **Copy all** menu item in the pop-up menu appearing has the same effect.

Clicking on  in the communication log toolbar deletes the communication log. Clicking the right mouse button in the communication log window followed by selection of the **Clear** menu item in the pop-up menu appearing has the same effect

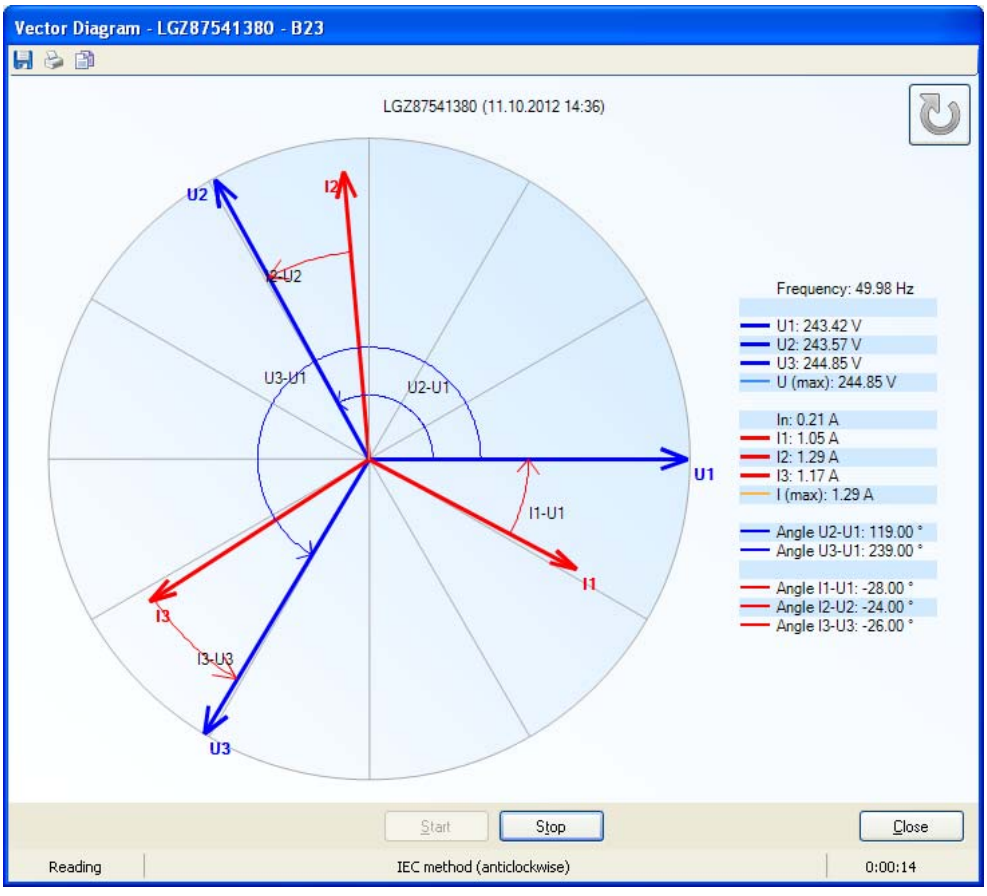
5.8 Status Bar

The following data is displayed in the status bar:

- Session information, e.g. busy or disconnected (left)
- Protocol, port and transmission rate (in parentheses)
- Number of objects sent (blue) and received (green)

5.9 Evaluation Window

Diagnostic commands such as "GSM Installation Support" or "Vector Diagram" are displayed in separate evaluation windows.



6 Communication with Devices

This section describes all aspects of communication with devices, in particular the communication settings in the Landis+Gyr .MAP110 Service Tool for various applications.

6.1 Interface to Device

The communication connection from the Landis+Gyr .MAP110 Service Tool to one or more devices can be made in various ways:

- With a **serial** connection to a device.
  - With an optical reading head placed at the optical interface of the device (only point-to-point connection to a device possible).
  - With a Bluetooth reading head (radio transmission over short distances, only point-to-point connection to a device possible).
  - With a direct connection to a device, e.g. via an RS232, M-Bus or Ethernet interface as used in various communication units. If the communication unit has a second interface, multiple connections are possible to further devices.
- With a **modem** connection to a device or several devices, if these are connected together by a multiple connection by RS485, CS or M-Bus. Note: the modem must first have been installed and configured on the PC.
- With a **network** connection over the Internet to a device or several devices, if these are connected together by a multiple connection by RS485, CS or M-Bus. Note: For TCP/IP connections over the Internet via a gateway (e.g. a Landis+Gyr iMega server) a virtual COM port and a corresponding standard modem driver must have been installed.

6.2 Establishing the Communication with Devices

Once the communication settings have been made (see section 6.3 "Communication Settings") the communication with a device can be established as follows:

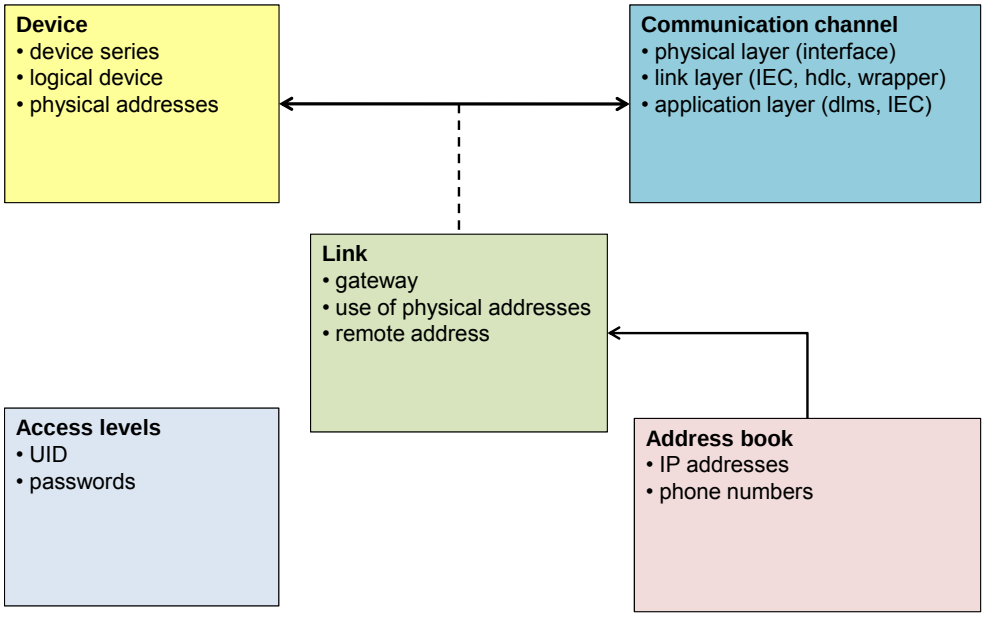
- Select the required device from the "Device" selection box.
- Select the required communication channel from the "Channel" selection box.
- Select the required access level from the "Access Level" selection box (for modem connections the predefined access level is used and the selection box is inhibited until the connection is established, then the selection is possible). Only access levels, which have been completely defined in the communication settings, are displayed for selection (see also section 6.3.6 "Defining Access Levels")
- Only for modem connections: select the required phone number from the "Phone" selection box.
- Only for modem connections: click on  in the address toolbar to establish the connection to the device.
- Only for network connections: select the required IP address number from the "IP Address" selection box.
- Execute the required command from the command tree.

6.3 Communication Settings

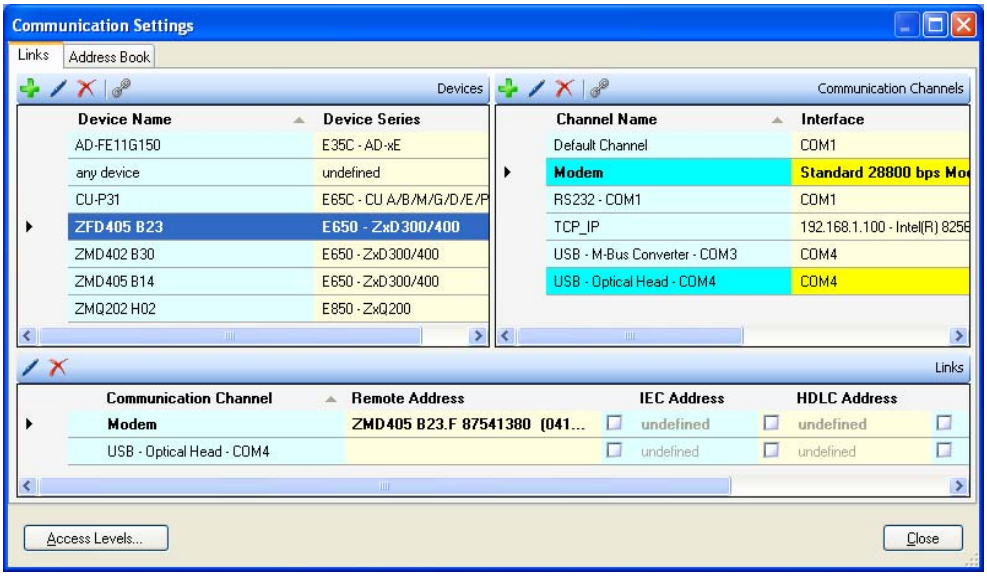
The communication settings in the Landis+Gyr .MAP110 Service Tool comprise the following four data categories:

- Device
- Communication channels
- Address
- Access levels

Device, communication channel and addresses are linked in a suitable way (see following overview diagram and section 6.3.1 "Data Linking") to allow flexible and convenient use.



All communication settings can be defined and modified in the "Communication Settings" window.



To display this window

- click on  in the application toolbar or
- select **Communication settings** from the **Communication** menu

The "Links" tab with the last used device is selected when opening the window.

The following subsections explain the principals, the recommended order of data acquisition for all data categories and specify the individual data fields.

Examples of various communication connections are shown in section 6.4 "Communication Examples".

All communication settings are stored per user in the files "DeviceConnection SettingsV8.xml" and "AddressBookV8.xml" which are located in the directory defined under **Options** in the **Tools** menu (see section 7.5.8 "Defining File Locations").

6.3.1 Data Linking Principle

Each defined device can be linked to one or several defined communication channels and each communication channel can be linked to one or several defined devices.

Example

4 devices and 4 communication channels are defined and linked according to the following matrix.

	Channel 1	Channel 2	Channel 3	Channel 4
Device 1	x			
Device 2	x	x		x
Device 3			x	
Device 4		x		x
any device	x			x

This means:

- Device 1 is accessible via channel 1
- Device 2 is accessible via channels 1, 2 and 4
- Device 3 is accessible via channel 3
- Device 4 is accessible via channels 2 and 4
- Channel 1 is usable for communication with device 1 and 2
- Channel 2 is usable for communication with device 2 and 4
- Channel 3 is usable for communication with device 3
- Channel 4 is usable for communication with device 2 and 4

Additionally, there is always a default device "any device" defined, which is automatically linked with all communication channels.

Only the usable (linked) communication channels for a selected device are selectable in the channel selection box (see section 5.3.4 "Device Toolbar".

For each device/communication channel link the following attributes can be defined, if required:

- IEC address (if defined for the device)
- HDLC address (if defined for the device)
- Phone number (for modem communication channels only)
- IP address and port number (for TCP/IP communication channels only)
- Gateway LAN profile and address*

  * If a device in a local network is not reachable directly, a gateway must be used (Example: Zigbee device via Ethernet gateway). The gateway needs additional information to forward dlms requests to the correct device in the local network:

  – the network must be identified by a number (LAN profile) and

  – the address of the device in the local network must be given in the correct format (LAN address).

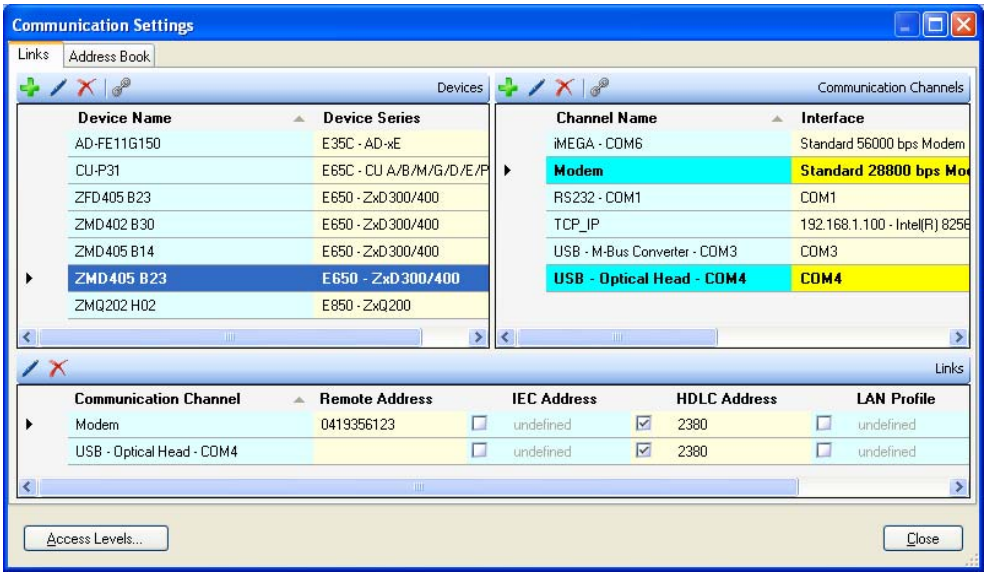
  For further details please refer to the description of the gateway.

Gateway feature not yet supported by Landis+Gyr devices
Please note that the gateway feature is for future expansion only and not yet supported by the Landis+Gyr devices. For the time being make sure to disable it.

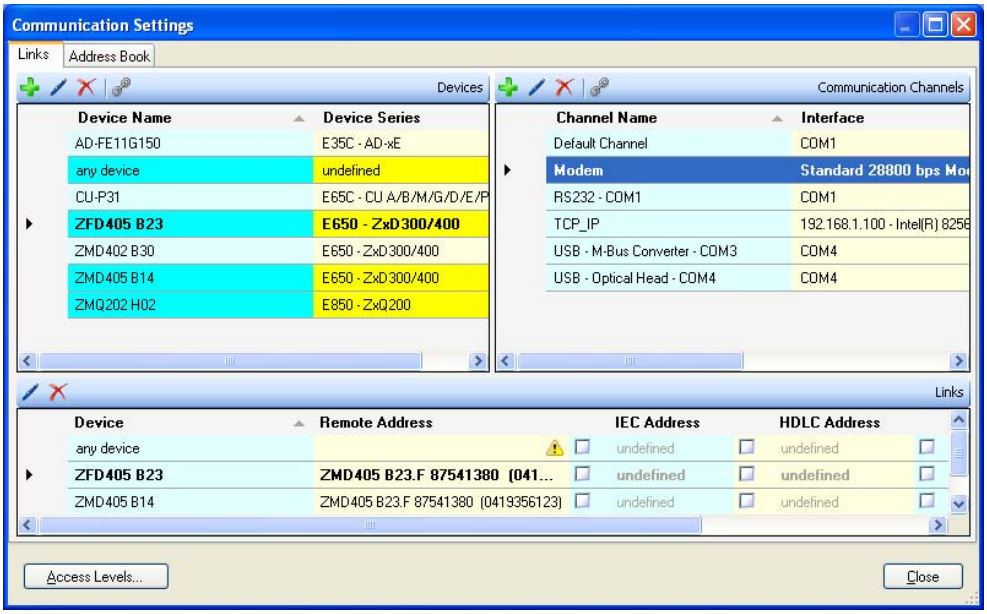
If more than one communication channel is defined for a device, one channel can be determined as preferred channel. When selecting this device the preferred channel is always selected as default channel.

The data linking is indicated in the "Communication Settings" window as shown below.

In the following figure a device is selected in the "Devices" area. The device is highlighted (blue). All the linked communication channels are also highlighted in the "Communication Channels" area (light blue/yellow) and the links with their attributes are shown in the "Links" area.



In the figure below a communication channel is selected in the "Communication Channels" area (highlighted blue). All the linked devices are also highlighted in the "Devices" area (light blue/yellow) and the links with their attributes are shown in the "Links" area.



Landis+Gyr recommend to define the required data in the following sequence:

1. Devices (see section 6.3.2 "Defining Device Data")*
2. Communication channels (see section 6.3.3 "Defining Communication Channel Data")
3. Addresses (see section 6.3.4 "Defining Address Data")*
4. Links between devices and communication channels including the relevant attributes (see section 6.3.5 "Defining Links between Devices and Communication Channels"
5. Access levels (see section 6.3.6 "Defining Access Levels").

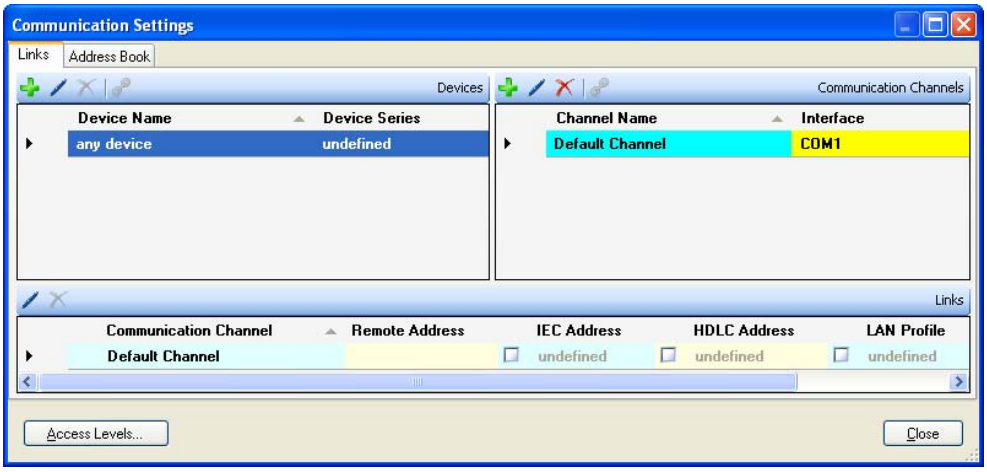
* If a Landis+Gyr MAP110 (version 3.x) or .MAP110 (version 4.x) Service Tool is already installed on the computer, its phone or address book can be imported. With the import of a MAP110 phone book additionally all device addresses from the phone book are converted into devices. In this case it is advisable to import the phone book first and then define the new device definitions and communication channels.

6.3.2 Defining Device Data

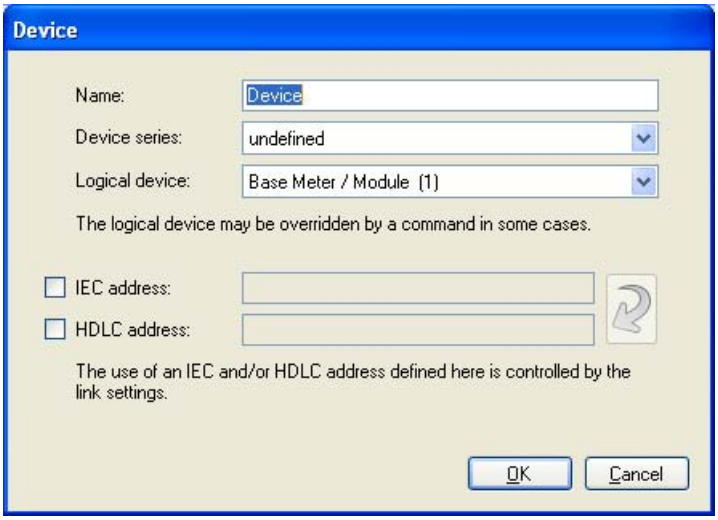
After the installation of the .MAP110 Service Tool, only a default device named "any device" and a default communication channel named "Default Channel" are defined. With this default communication settings, a local readout of a meter with an optical reading head connected to port COM1 is possible (see section 4 "First Steps").

The following basic procedure should be adopted to produce and store a new device definition (specific examples are given in section 6.4 "Communication Examples"):

1. Click on  in the application toolbar or select **Communication settings** from the **Communication** menu.
   The "Communication Settings" window appears with selected tab "Links".

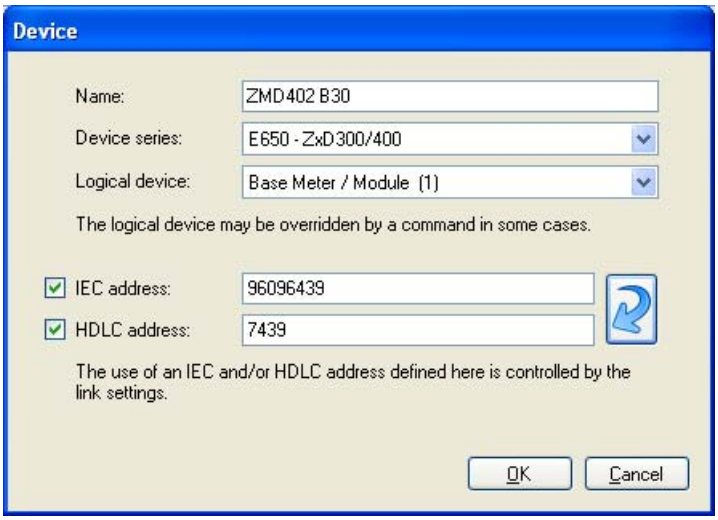


2. Click on  in the window toolbar in the "Devices" area.
   The "Device" window appears. The entry box "Name" contains the placeholder name "Device", all other boxes are filled with the data of the selected device and can now be modified.

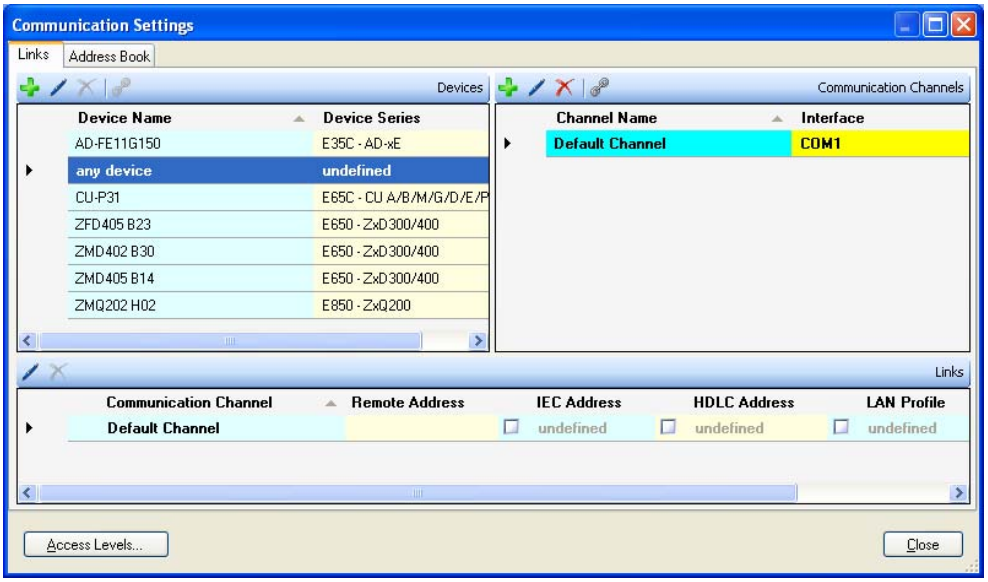


3. Enter a name for the new device definition in the entry box "Name".
4. Select the device series in the selection box "Device series".
   With this setting the command tree is automatically switched to the appropriate view. If you leave "undefined", no adaptation of the command tree occurs.

5. Select the device type in the selection box "Logical device": "Base meter / Module (1)" or "Communication Unit (17)".
   Note that the logical device may be overridden by a command in some cases.
6. If a device address shall be used: set a tick to the "IEC address" and/or "HDLC address" checkbox and enter the address(es). If you enter an IEC address first and then click on the arrow button behind the two entry boxes, the HDLC address is automatically calculated and entered (see section 6.3.7 "Addressing Devices").



7. Click on **OK**.
   The new device definition is saved and then appears as entry in the device list ("Devices" area).
8. Define further devices in the same way (repeat points 2 to 7).
9. If you have imported address data from a MAP110 phone book, modify the "undefined" device series to the appropriate device series and delete imported devices which are not required.



Modifying or deleting device definitions

Click on  in the window toolbar in the "Devices" area to modify the marked device definition or double click on the device definition.

Click on  in the window toolbar in the "Devices" area to delete the marked device definition. Deletions must be confirmed.
The default device definition "any device" can't be deleted.

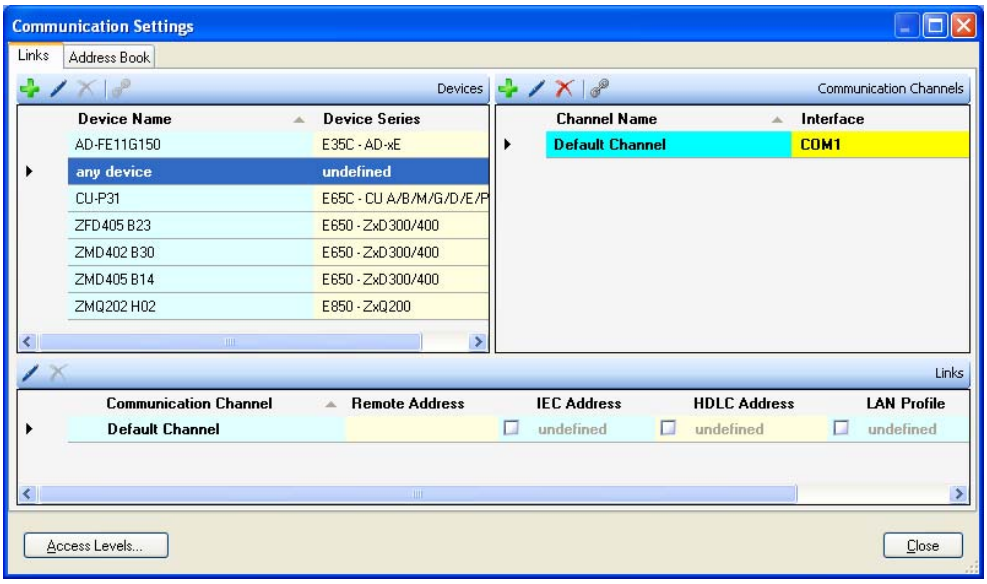
10. Click on **Close**.
    The "Communication Settings" window disappears.

6.3.3 Defining Communication Channel Data

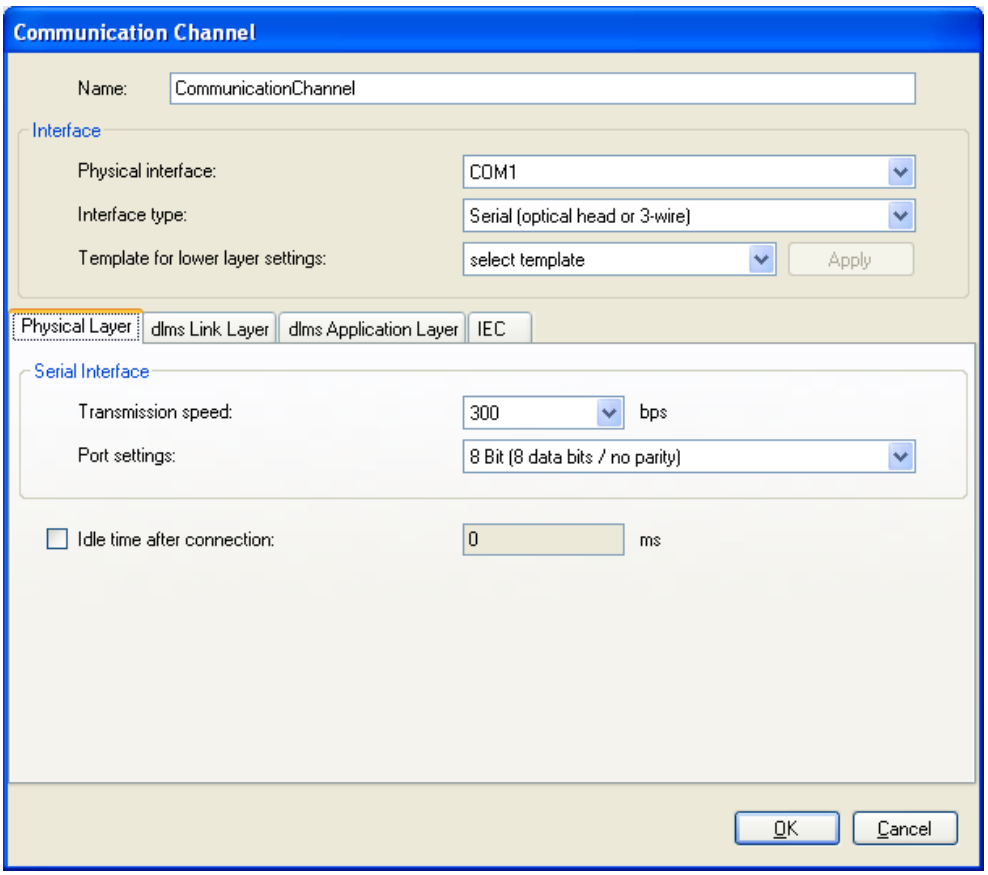
After the installation of the .MAP110 Service Tool only a default device named "any device" and a default communication channel named "Default Channel" are defined. With this default communication settings a local readout of a meter with an optical reading head connected to port COM1 is possible (see section 4 "First Steps").

The following basic procedure should be adopted to produce and store a new communication channel definition (specific examples are given in section 6.4 "Communication Examples"):

1. Click on  in the application toolbar or select **Communication settings** from the **Communication** menu.
   The "Communication Settings" window appears with selected tab "Links" (here with devices defined according to the previous section).



2. Click on  in the window toolbar in the "Communication Channels" area.
   The "Communication Channel" window appears. All fields are filled with the data of the selected communication channel and can now be modified.



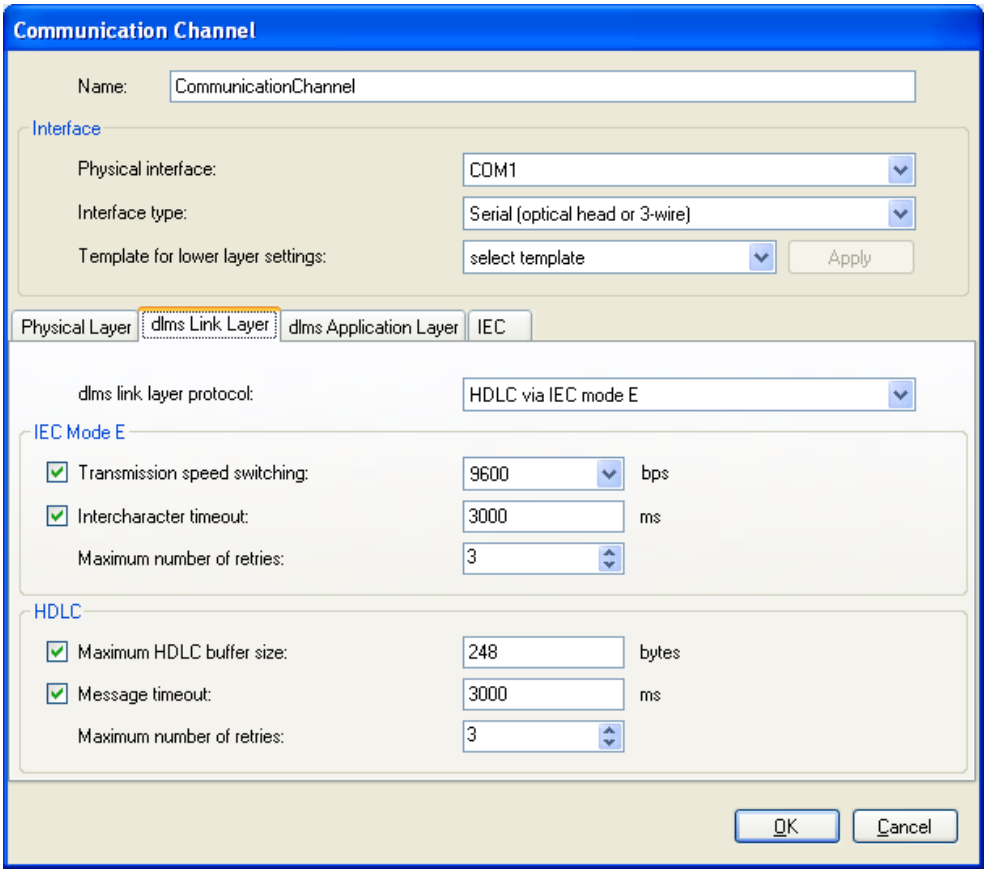
3. Select the serial interface to be used in the "Physical interface" selection box or the modem to be used for remote communication and for Ethernet connections the entry of the network card to be used. The COM port number of a serial interface can be found in the Windows device manager.
4. Select the "Serial (optical head or 3-wire)", "Bluetooth optical head (PMR_1)" or "Bluetooth optical head (PMR_1A)" type used in the "Interface type" selection box for serial communication, depending on how the device is connected. The selection box is inhibited for modem and Ethernet connections. This is necessary because an echo signal is often produced when using an optical reading head, which can be suppressed by the .MAP tool. This effect does not occur with other connections than optical.
5. Select the suitable template for the communication channel settings in the "Template for lower layer settings" selection box. The following templates are available (selection possibilities dependent on the selected physical interface and interface type):
   - Serial - IEC
   - Serial - dlms
   - M-Bus - dlms
   - Bluetooth - IEC
   - Bluetooth - dlms
   - PSTN Modem
   - GSM Modem
   - Wired - HDLC
   - Wired - Wrapper

- Wireless - HDLC
- Wireless - Wrapper

After selection of a template and clicking on "Apply" all communication channel settings are set automatically. You can directly proceed with point 24 or check the settings according to the following steps.

6. Select the "Physical Layer" tab.
7. Select the transmission rate corresponding to the device in the "Transmission speed" selection box for local communication. The selection box is inhibited for modem and Ethernet connections.
8. Select the required communication port settings in the "Port settings" selection box:
   - **8 Bit (8 data bits / no parity)** (default), to be used normally
   - **9 Bit (8 data bits / even parity)**, to be used if the connection to the serial interface of the PC is made via an USB M-Bus converter

   The selection box is inhibited for modem and Ethernet connections.
9. Tick the "Idle time after connection" checkbox if you want to modify the default initial delay (IEC standard value = 0), e.g. with GSM networks. Then enter the required value in the "Idle time after connection" entry box.
10. Select the "dlms Link Layer" tab (the settings on this tab apply if the dlms protocol is used).

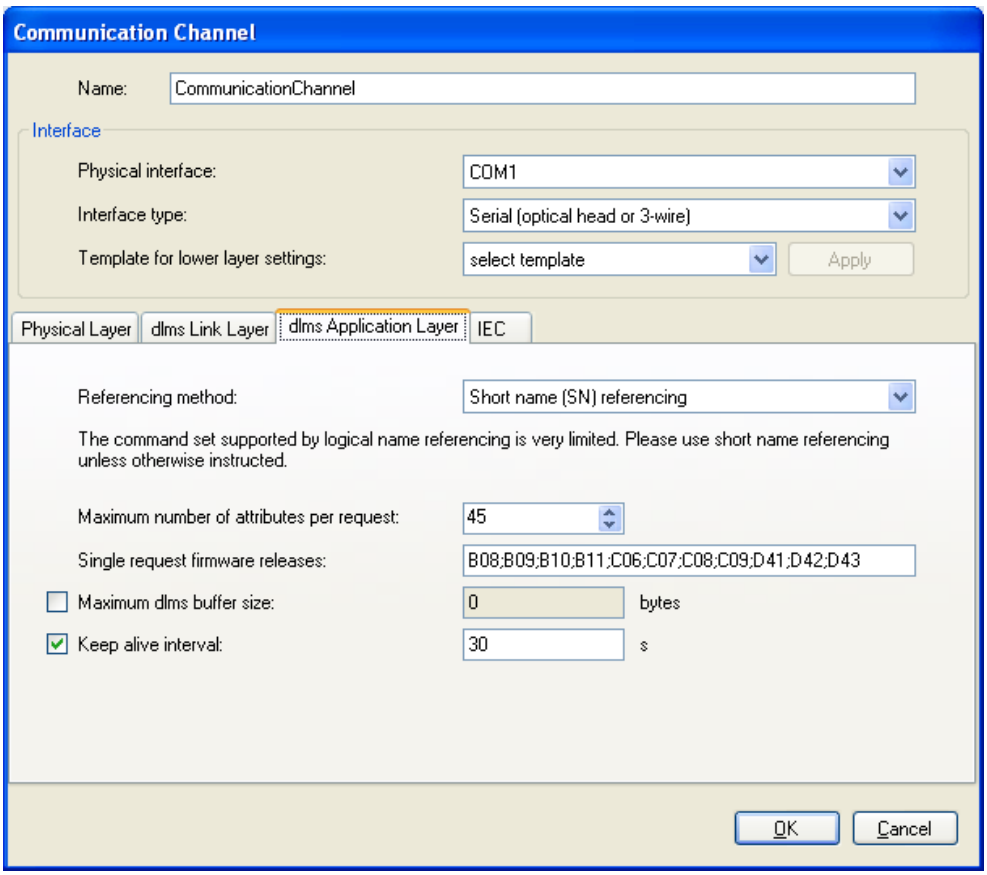


11. Select the required protocol for the planned activity in the "dlms Link layer protocol" selection box. Possible settings:
    - **HDLC**, if the HDLC protocol must be used
    - **HDLC via IEC mode E** (default), if the IEC protocol must be used for opening the communication
    - **COSEM Wrapper**, if the COSEM Wrapper over the TCP protocol must be used
12. Depending on the selected link layer protocol, the IEC Mode E, HDLC or COSEM Wrapper areas are displayed to make the required settings.

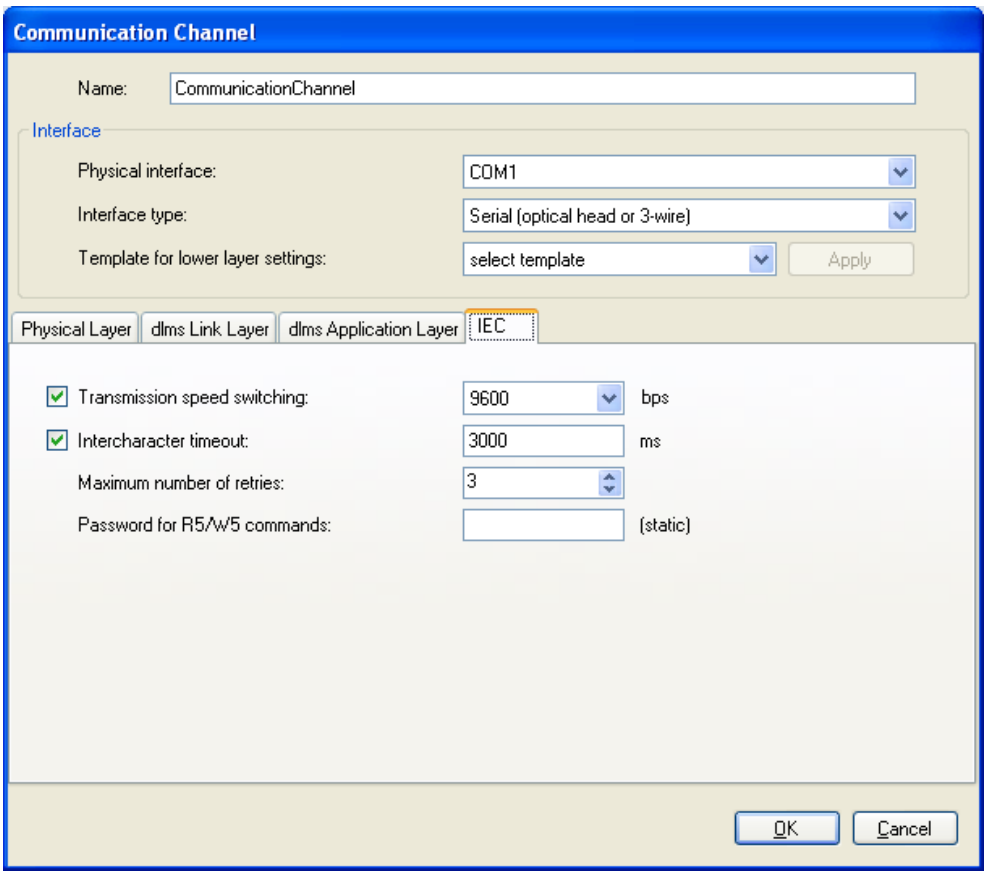
    In the **IEC Mode E** area (only displayed if "HDLC via IEC mode E" is selected as link layer protocol):
    - Transmission speed switching: Select the required maximum transmission rate (default = 9600 bps). Untick the checkbox if you don't want to allow transmission rate switching.
      Note: In case of modem or network connections no real change is made but only the transmission rate character in the protocol is altered.
    - Intercharacter timeout: After expiration of the set time the transmission is automatically ended if no further data is transmitted. If you untick the checkbox, no automatic termination of the transmission occurs.
    - Maximum number of retries: Select the number of retries (default value = 3). If you select 0, no retries occur.

    In the **HDLC** area (only displayed if "HDLC" or "HDLC via IEC mode E" is selected as link layer protocol):
    - Maximum HDLC buffer size: Tick the checkbox if you want to modify the default value (248 bytes). The HDLC buffer size determines how many useful data can be transmitted in one data packet. Reduce the value in case of communication problems.
    - Message timeout: If you untick the checkbox, no automatic termination of the transmission occurs.
    - Maximum number of retries: Select the number of retries (default value = 3). If you select 0, no retries occur.

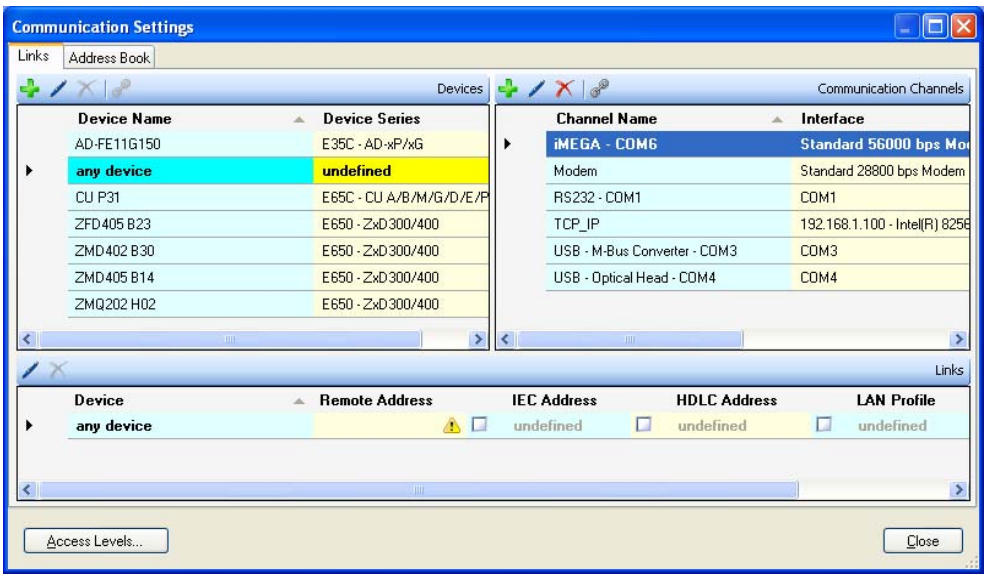
    In the **COSEM Wrapper** area (only displayed if "COSEM Wrapper" is selected as link layer protocol):
    - Message timeout: If you untick the checkbox, no automatic termination of the transmission occurs.
13. Select the "dlms Application Layer" tab (the settings on this tab apply if the dlms protocol is used).



14. Select "Short name (SN) referencing" or "Logical name (LN) referencing" method. The command set supported by LN referencing is very limited. The .MAP tools only work with short names. Therefore SN referencing is the preferred choice unless otherwise instructed.
15. Enter the "Maximum number of attributes per request". In case of readout problems this value (default = 45) can be reduced down to 1. It should be noted that this slows down the readout.
16. If required, modify the "Single request firmware releases". This entry box contains all versions (separated by semicolons), for which automatically single requests will be used.
17. If not inhibited, tick the "Maximum dlms buffer size" checkbox if you want to modify the maximum buffer size in the .MAP tool for writing of data (default value = 0). Then enter the required value in the "Maximum dlms buffer size" entry box. Principally the buffer sizes for writing and reading reported from the device are used. If a maximum buffer size is determined, this size is not exceeded, even if the device reports a bigger write buffer size. If you untick the checkbox, the buffer size is unlimited, i.e. buffer size indicated by the device is used.
18. Keep alive interval: After this time an "Alive-Packet" is to be sent in order to maintain the connection. The value must be greater than the message timeout value. If you untick the checkbox, the function is switched off.
19. Select the "IEC" tab (the settings on this tab apply if the IEC protocol is used).



20. Select the required maximum transmission rate (default = 9600 bps) in the "Transmission speed switching" selection box. Untick the checkbox if you don't want to allow transmission rate switching.
    Note: In case of modem or network connections no real change is made but only the transmission rate character in the protocol is altered.
21. Intercharacter timeout: After expiration of the set time the transmission is automatically ended if no further data is transmitted. If you untick the "Intercharacter timeout" checkbox, no automatic termination of the transmission occurs.
22. Select the number of retries (default value = 3) in the "Maximum number of retries" selection box. If you select 0, no retries occur.
23. Enter the required static password (8 characters) for R5/W5 commands in the "Password for R5/W5 commands" entry box.
24. Enter a name for the new communication channel definition in the entry box "Name".
25. Click on **OK**.
    The new communication channel definition is saved and then appears as entry in the communication channel list ("Communication Channels" area).
26. Define further required communication channels in the same way (repeat points 2 to 25).
27. Delete the default communication channel definition "Default Channel" from the communication channel list if it is no longer required.



Modifying or deleting communication channel definitions

Click on  in the window toolbar in the "Communication Channels" area to modify the marked entry of the communication channel list or double click on the entry.

Click on  in the window toolbar in the "Communication Channels" area to delete the marked entry of the communication channel list. Deletions must be confirmed.

28. Click on **Close**.
    The "Communication Settings" window disappears.

6.3.4 Defining Address Data

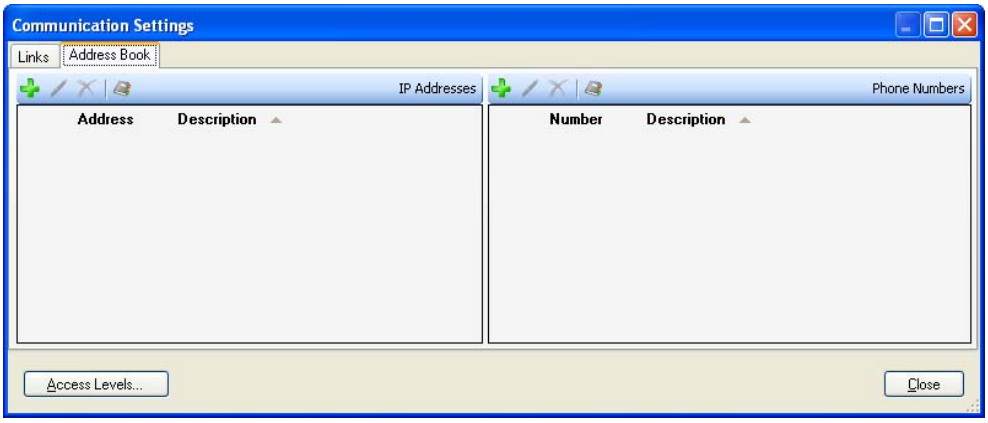
After the installation of the .MAP110 Service Tool, no address data (IP addresses and phone numbers) are defined.

If the Landis+Gyr MAP110 or .MAP110 Service Tool is already installed on the computer, its address book can be imported.

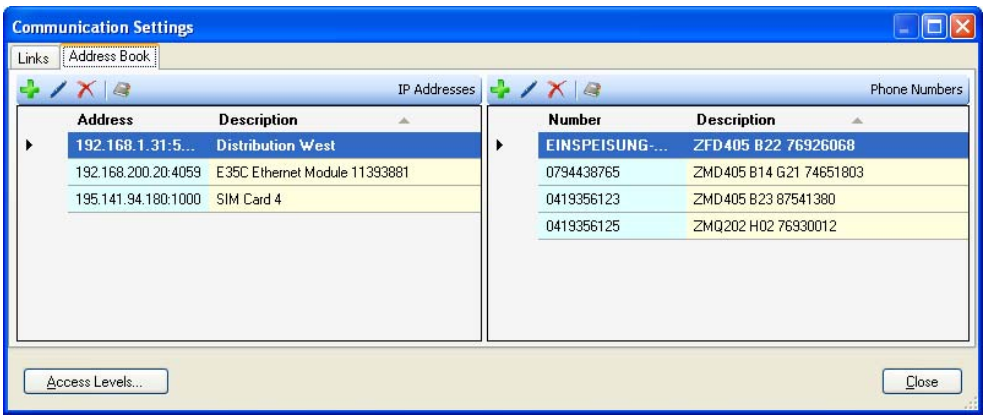
6.3.4.1 Importing Address Book

Import an existing address book as follows:

1. Click on  in the application toolbar or select **Communication settings** from the **Communication** menu.
   The "Communication Settings" window appears with selected tab "Links".
2. Select the "Address Book" tab.



3. Click on  in the window toolbar for IP addresses or phone numbers.
   The "Import Address Book" window (open dialog) appears.
4. Select in the open dialog the phone book file to be imported (the corresponding directory of the latest installed MAP110 version 3.x will be selected by default, to directories of .MAP versions 4.x you must navigate yourself):
   - "PhoneBook.xml" for importing a MAP110 phone book or
   - "AddressBookV7.xml" or "AddressBookV8.xml" for importing a .MAP110 phone book.
5. Click on **Open**.
   All IP addresses and phone numbers are imported from the selected address book if not already existing in the .MAP110 address book. The imported data appear as entries in the IP addresses list and in the phone number list.
   When a MAP110 phone book "PhoneBook.xml" has been imported, additionally all device addresses are converted into devices.



Modifying or deleting address book entries

Click on  in the window toolbar to modify the marked entry of the address book or double click on the entry.

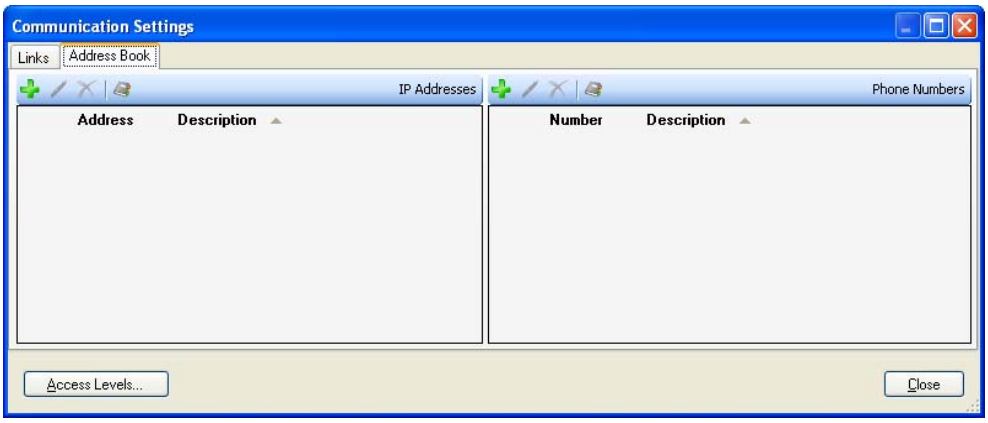
Click on  in the window toolbar to delete the marked entry of the address book. Deletions must be confirmed.

6. Click on **Close**.
   The "Communication Settings" window disappears.
7. If you have imported address data from a MAP110 phone book "PhoneBook.xml", check the device settings (see section 6.3.2 "Defining Device Data") again, since device addresses from the imported phone book have been converted into devices. Before you can use the device definitions created that way these have to be linked manually with a communication channel (see section 6.3.5 "Defining Links between Devices and Communication Channels").

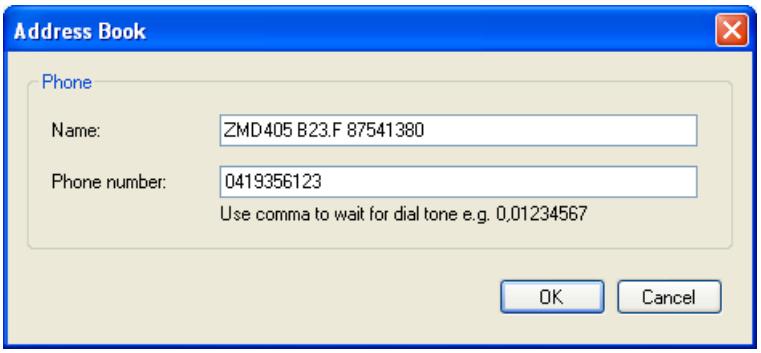
6.3.4.2 Defining Phone Numbers

Define the phone numbers required for modem connections as follows:

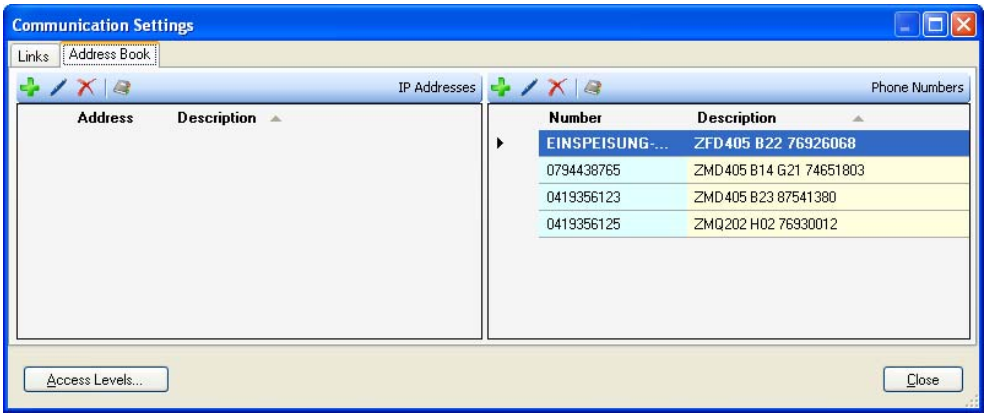
1. Click on  in the application toolbar or select **Communication settings** from the **Communication** menu.
   The "Communication Settings" window appears with selected tab "Links".
2. Select the "Address Book" tab.



3. Click on  in the window toolbar for phone numbers (right window).
   The "Address Book" window appears.
4. Enter a clear designation of the device in the "Name" entry box and the phone number of the desired device in the "Phone number" entry box.



5. Click on **OK**.
   The "Address Book" window disappears. The phone number is saved and then appears as entry in the address book.
6. Define further phone numbers in the same way (repeat points 3 to 5).



Modifying or deleting address book entries

Click on in the window toolbar to modify the marked entry of the address book or double click on the entry.

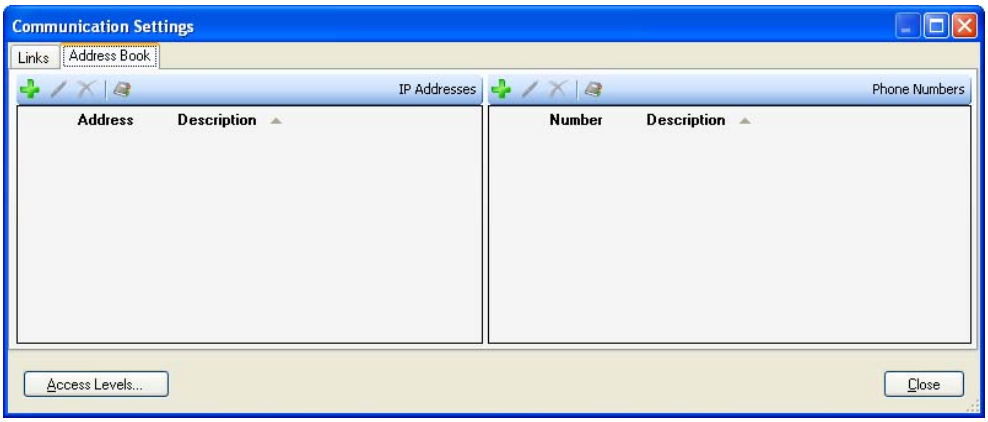
Click on in the window toolbar to delete the marked entry of the address book. Deletions must be confirmed.

7. Click on **Close**.
   The "Communication Settings" window disappears.

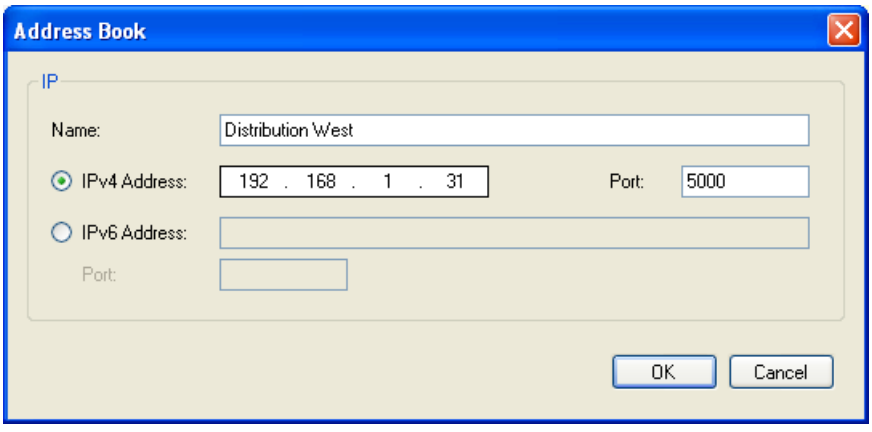
6.3.4.3 Defining IP Addresses

Define the IP addresses required for TCP/IP connections as follows:

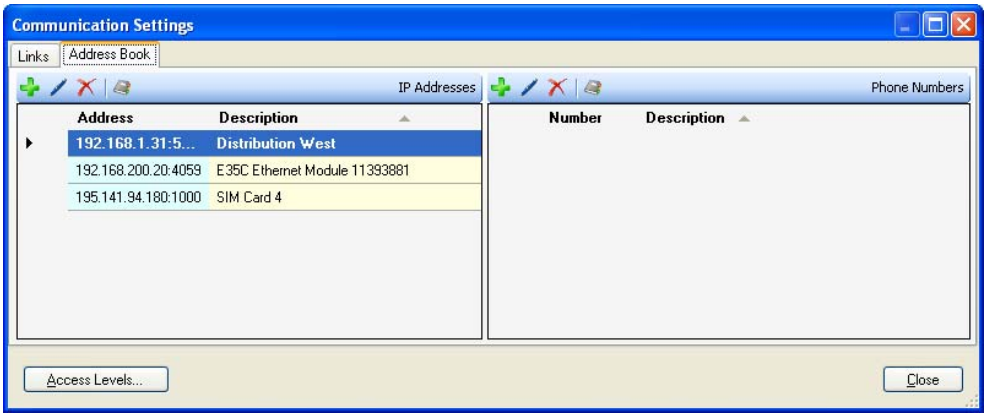
1. Click on in the application toolbar or select **Communication settings** from the **Communication** menu.
   The "Communication Settings" window appears with selected tab "Links".
2. Select the "Address Book" tab.



3. Click on in the window toolbar for IP addresses (left window).
   The "Address Book" window appears.
4. Enter a clear designation of the device location in the "Name" entry box.
5. Select with the corresponding radio button whether an IPv4 address or an IPv6 address shall be entered. Enter the IPv4 or IPv6 address in the corresponding entry box and the port number of the desired device in the "Port" entry box.



6. Click on **OK**.
   The "Address Book" window disappears. The IP address is saved and then appears as entry in the address book.
7. Define further IP addresses in the same way (repeat points 3 to 6).



Modifying or deleting address book entries

Click on  in the window toolbar to modify the marked entry of the address book or double click on the entry.

Click on  in the window toolbar to delete the marked entry of the address book. Deletions must be confirmed.

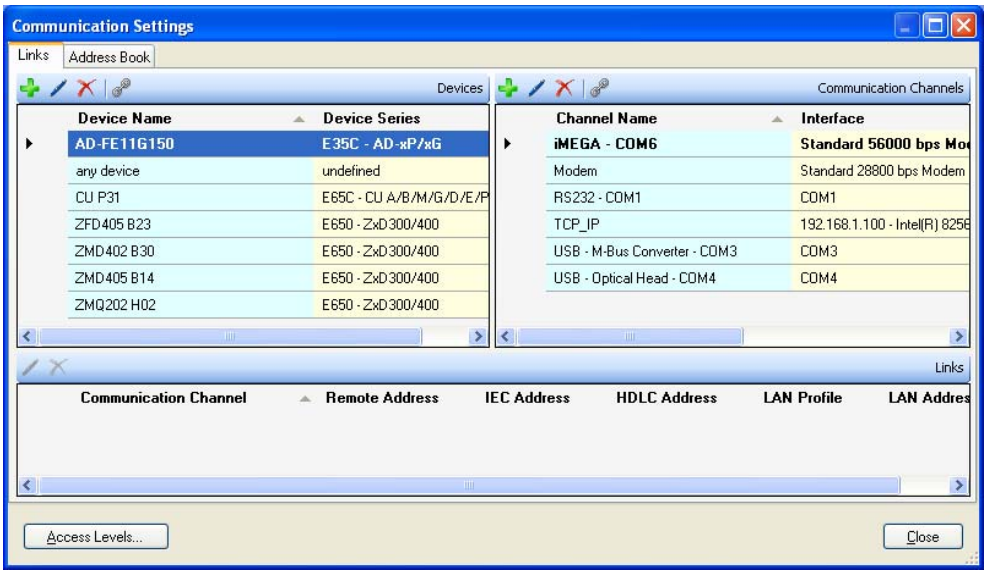
8. Click on **Close**.
   The "Communication Settings" window disappears.

6.3.5 Defining Links between Devices and Communication Channels

When the definition of devices, communication channels and addresses has been finished according to the previous sections, the links between these data must be defined.

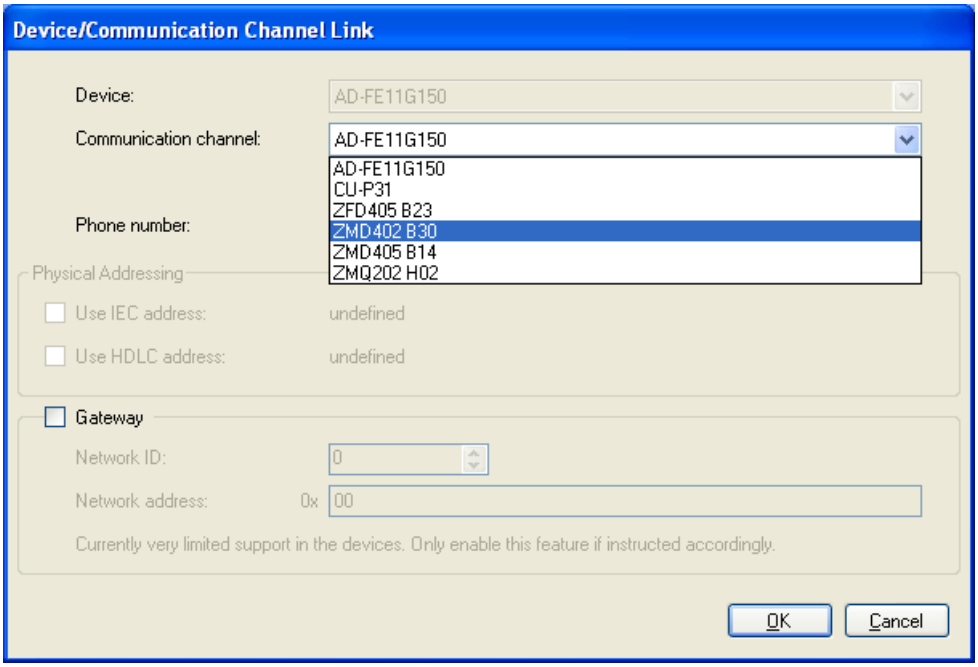
Proceed as follows:

1. Click on  in the application toolbar or select **Communication settings** from the **Communication** menu.
   The "Communication Settings" window appears with selected tab "Links". The device list and the communication list are displayed.

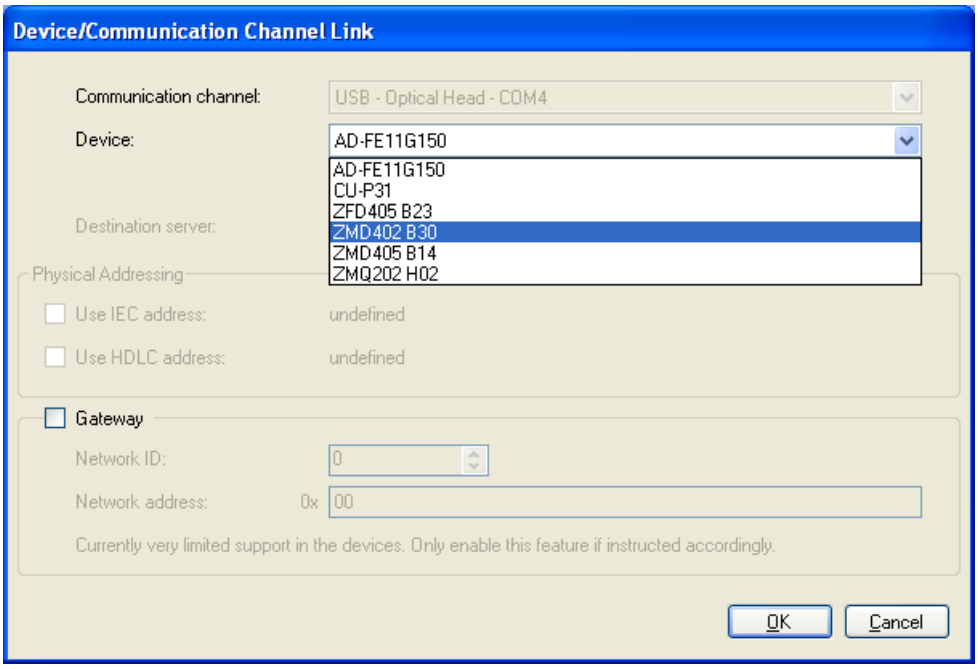


2. Select a device from the device list (or alternatively a channel from the communication channels list).

3. Click on  in the window toolbar in the "Devices" area (or alternatively in the "Communications Channels" area).
   The "Device/Communication Channel Link" window appears with the device fixed and the communication channel selectable:



or alternatively with the communication channel fixed and the device selectable:

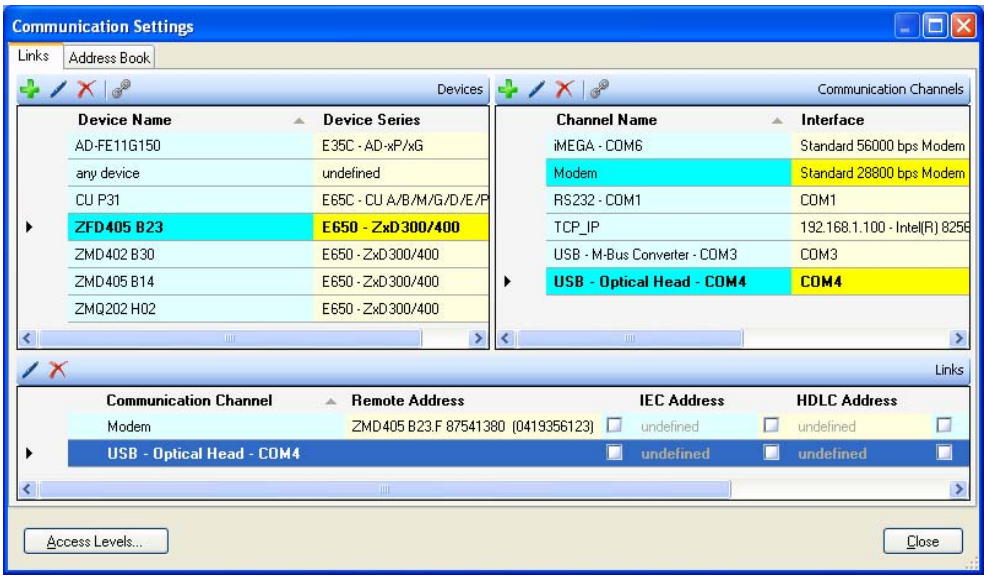


4. In the "Communication Channel" selection box select one of the defined communication channels (or alternatively in the "Device" selection box one of the defined devices).
5. If more than one communication channel is defined for a device, one channel can be determined as preferred channel. When selecting this device the preferred channel is always selected as default channel. Tick for this the checkbox "This is the preferred channel for this device". The preferred channel is then marked with a yellow star in the "Communication Settings" window.
6. Only for modem communication channels: in the "Phone Number" selection box select one of the defined phone numbers.
7. Only for TCP/IP communication channels: in the "Destination server" selection box select one of the defined IP addresses.
8. If the IEC or HDLC address defined for the device shall be used: set a tick to the "Use IEC address" or "Use HDLC address" checkbox.

Gateway feature not yet supported by Landis+gyr devices
Please note that the gateway feature is for future expansion only and not yet supported by the Landis+Gyr devices. For the time being make sure to disable it.

9. If a gateway shall be used: set a tick to the "Gateway" checkbox, select a network ID and enter the required network address.
10. Click on **OK**.
    The "Device/Communication Channel Link" window disappears and the new defined link is displayed in the communication channel links list ("Links" area).
11. If more than one communication channels shall be usable to access the device (or alternatively if more than one device shall be accessible via the communication channel), define another link the same way (repeat points 3 to 10).

12. Define the links for all devices (or alternatively for all communication channels) the same way (repeat points 2 to 11).



Modifying or deleting links

Click on  in the window toolbar in the "Links" area to modify the marked entry of the link list or double click on the entry.

Click on  in the window toolbar in the "Links" area to delete the marked entry of the link list. Deletions must be confirmed.
Links related to the default device "any device" can't be deleted, they only can be edited.

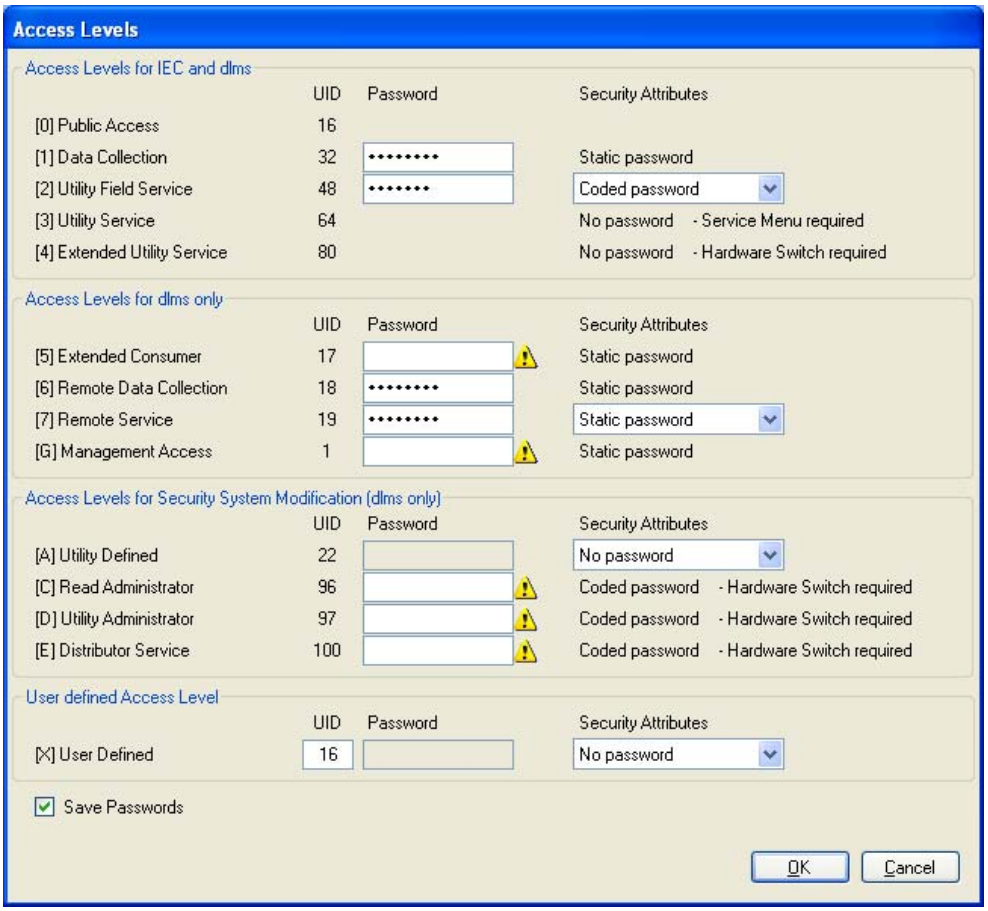
6.3.6 Defining Access Levels

After the installation of the .MAP110 Service Tool no passwords for the different access levels are defined. Therefore only the access levels without password protection, e.g. "[0] Public Access" can be used (see example in section 4 "First Steps").

The various access levels and their fields of application are described in section 10 "Short Description of Device Security System".

Define the passwords used by the .MAP110 Service Tool for all required access levels according to the passwords set in the devices as follows:

1. Click on  in the application toolbar or select **Communication settings** from the **Communication** menu.
   The "Communication Settings" window appears with selected tab "Links".
2. Click on **Access Levels**.
   The "Access Levels" window appears.
3. For access levels [2], [7], [A] and [X] select the password type (No password, Static password, Coded password or Key).
4. Enter the required passwords in the password entry boxes.
   Note that static passwords must have exactly 8 characters, coded passwords exactly 7 characters and encryption keys exactly 32 characters. A ⚠ symbol is displayed behind the entry field, as long as the access level is not correctly defined (e.g. missing or incomplete password). Accordingly marked access levels will not be shown in the access level toolbar.



5. Repeat points 3 and 4 for the access levels [2], [7], [A] and [X] if on any of these access levels a further password type shall be usable (in this case both password types are stored and displayed in the access level toolbar, in the following example Coded password and Key for access level [2]).

6. Untick the checkbox "Save Passwords" if the password should not be saved. In this case all passwords entered get lost when terminating the program.

7. Click on **OK**.
   The passwords are stored and the "Access Levels" window disappears. All access levels, which have been completely defined will be selectable in the "Access Level" selection box of the access level toolbar.

8. Click on **Close**.
   The "Communication Settings" window disappears.

6.3.7 Addressing Devices

For point-to-point connections, the device does not need to be specially addressed. However, with multi-drop, all devices connected to a bus system (RS485 or CS) must have their own address for individual access. This address is called the **physical device address**. In fact, even two physical device addresses are used, one for the IEC protocol (IEC device address) and the other for the DLMS protocol (HDLC device address).

Unless otherwise specified on the order, the following parameter values are set as defaults for these physical device addresses:

- Physical **IEC** device address = serial number (printed on face plate of device), e.g. 73852799.
- Physical **HDLC** device address = last 4 digits of serial number plus 1000 (because with dlms the range of addresses is limited and some addresses are reserved), e.g. 3799 for a serial number 73852799 (2799 + 1000 = 3799).

The physical device addresses are saved as parameters of the basic meter and not in the possibly used E65C communication unit. A change of the E65C communication unit does therefore not affect the addressing. With the Landis+Gyr .MAP110 Service Tool, the physical device addresses of the devices can be read with the read commands under "Communication" or modified with the write commands under "Communication".

6.4 Communication Examples

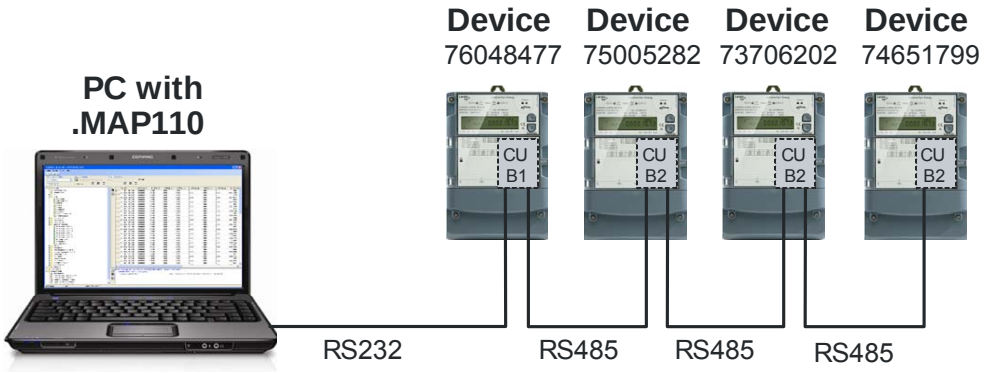
This section provides some examples to show how communication connections are made to devices via various communication paths and for various applications:

- Serial connection (see section 6.4.1)
- Modem connection (see section 6.4.2)
- Network connections (see sections 6.4.3 and 6.4.4)

It is assumed in all examples that the physical connections (e.g. cable or modem connections) have already been made and the Landis+Gyr .MAP110 Service Tool has already been started.

6.4.1 Serial Connection to a local Bus

This example shows how a multiple connection is made to several devices mutually connected via RS485 interfaces. dlms is used as communication protocol. In the layout diagram below, the device numbers are given for addressing.

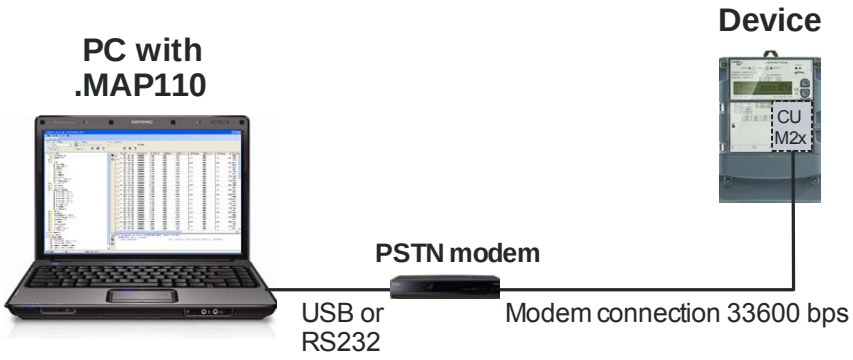


Procedure:

1. In the "Device" selection box, select the device you want to read out device and in the "Channel" selection box the corresponding channel (if more than one channel is assigned to this device) or create a new device with the following settings (for procedure see section 6.3.2 "Defining Device Data" and section 6.3.3 "Defining Communication Channel Data"):
   - Physical interface = COM-Port assigned to the RS232 interface
   - Interface type = Serial (optical head or 3-wire)
   - Template for lower layer settings = Serial - dlms
   - Activated HDLC address = 9477 (this is calculated from the last 4 digits of the serial number 76048477 plus 1000 (see section 6.3.7 "Addressing Devices"). Note: to address an other meter change the device address accordingly in the device definition.
2. In the "Access Level" selection box select the required access level for the intended activity e.g. "[2] Utility Field Service".
3. Select the required command in the command tree.
   The command is executed.

6.4.2 Modem Connection

This example shows how a point-to-point connection is made for remote communication with a single device fitted with a communication unit with PSTN modem (CU-M2x) or with GSM modem (CU-G3x). dlms is used as communication protocol.

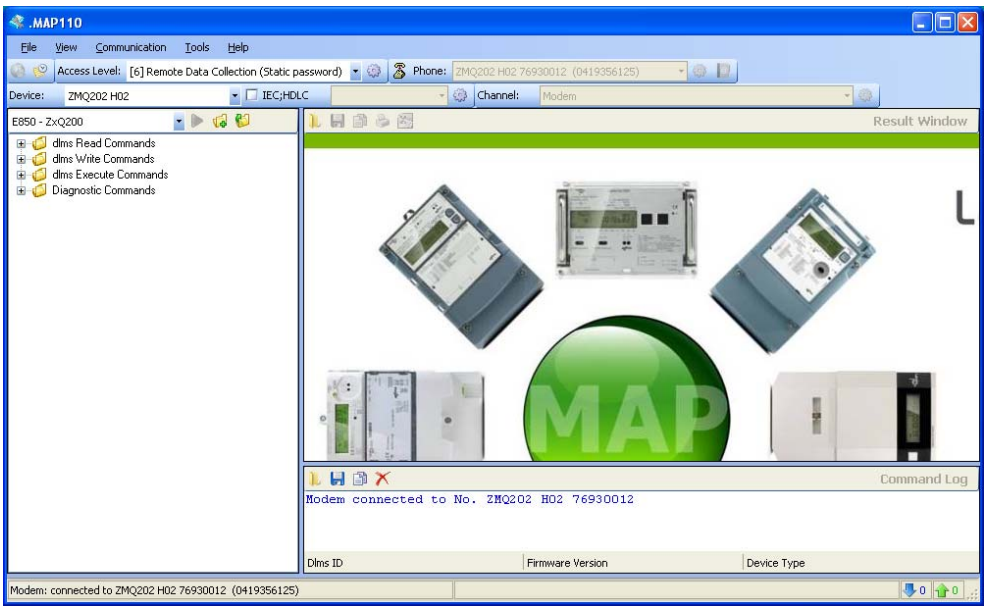


If further devices are connected to the device (multiple connection), their addressing has to be done with the physical device addresses as shown in the example in section 6.4.1 "Serial Connection to a local Bus".

Procedure:

1. In the "Device" selection box select the device you want to communicate with and in the "Channel" selection box the corresponding channel (if more than one channel is assigned to this device) or create a new device with the following settings (for procedure see section 6.3.2 "Defining Device Data" and section 6.3.3 "Defining Communication Channel Data"):
   - Physical interface = The available PSTN (or GSM) modem
   - Template for lower layer settings = PSTN (or GSM) Modem
2. In the "Access Level" selection box select the required access level for the intended work e.g. "[6] Remote Data Colection".
3. In the "Phone" selection box select the required phone number of the connected device. If not already predefined, define it (for procedure see section 6.3.4 "Defining Address Data").
4. Click on  in the address toolbar to make connection to the modem. While making the connection the "Command" window is displayed with a progress indication.

   When the connection is made, it is indicated in the command log window and in the status bar.

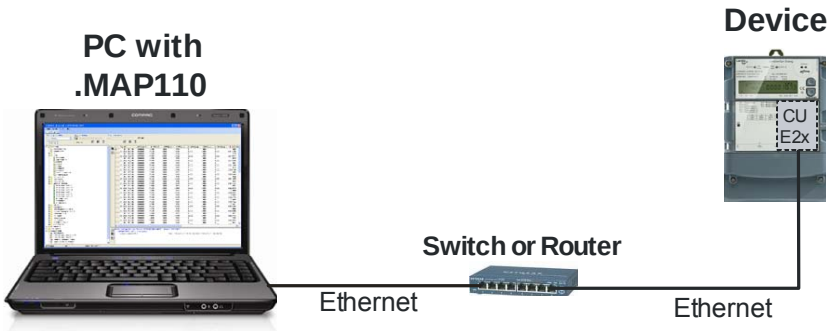


5. Select the required command in the command tree.
   The command is executed.

6. Click on  in the address toolbar to conclude the modem connection.

6.4.3 Network Connection via a LAN

This example shows how a point-to-point connection is made via a LAN to a single device equipped with a communication unit CU-E2x.



If further devices are connected to the device (multiple connection), their addressing has to be done with the physical device addresses as shown in the example in section 6.4.1 "Serial Connection to a local Bus".

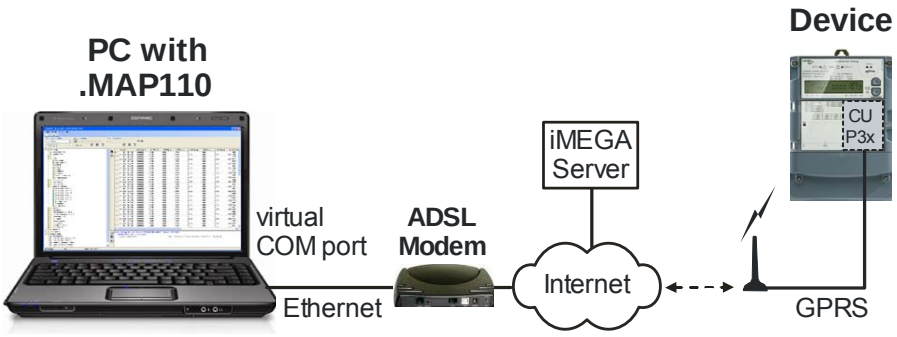
Procedure:

1. In the "Device" selection box select the device you want to communicate with and in the "Channel" selection box the corresponding channel (if more than one channel is assigned to this device) or create a new device with the following settings (for procedure see section 6.3.2 "Defining Device Data" and section 6.3.3 "Defining Communication Channel Data"):
   - Physical interface = The available network card
   - Template for lower layer settings = Wired HDLC
2. In the "Access Level" selection box select the required access level for the intended activity e.g. "[2] Utility Field Service".
3. In the "IP Address" selection box select the required IP address of the connected device. If not already predefined, define it (for procedure see section 6.3.4 "Defining Address Data").

4. Select the required command in the command tree.
   Communication is started and the command executed.

6.4.4 Network Connection via the Internet

This example shows how a point-to-point connection via the Internet is made to a single device equipped with a communication unit CU-P3x.

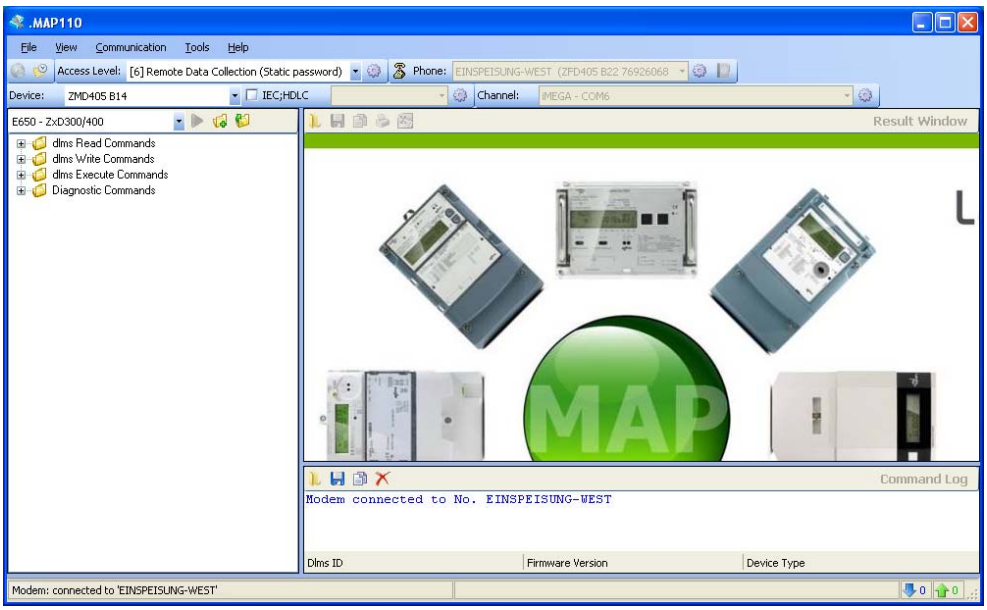


If further devices are connected to the device (multiple connection), their addressing has to be done with the physical device addresses as shown in the example in section 6.4.1 "Serial Connection to a local Bus".

Procedure:

1. In the "Device" selection box select the device you want to communicate with and in the "Channel" selection box the corresponding channel (if more than one channel is assigned to this device) or create a new device with the following settings (for procedure see section 6.3.2 "Defining Device Data" and section 6.3.3 "Defining Communication Channel Data"):
   - Physical interface = Modem, which has been defined for the virtual COM port to the iMEGA server
   - dlms link layer protocol = Corresponding to the characteristics of the device connected, e.g. HDLC
   - Idle time after connection = 500 ms
   - Message timeout = 10000 ms (this avoids the common session to be finished because of interruptions during data transmission)
2. In the "Phone" selection box select the required network ID of the connected device (this is treated for the call via the virtual COM port like a telephone number). If not already predefined, define it (for procedure see section 6.3.4 "Defining Address Data").
3. Click on  in the address toolbar to make connection to the iMEGA server.
   While making the connection the "Command" window is displayed with a progress indication.

   When the connection is made, it is indicated in the command log window and in the status bar.
4. In the "Access Level" selection box select the required access level for the intended activity e.g. "[6] Remote Data Collection".



5. Select the required command in the command tree.
   The command is executed.

6. Click on  in the address toolbar to conclude the connection to the iMEGA server.

6.5 Reference to Other Documents

Detailed information about Landis+Gyr Dialog communication solutions can be found in the following documents.

- **Data sheets** for the various communication units or modules
- **User manuals** for the various communication units or modules
- **Functional descriptions** of communication units or modules
- Detailed **application notes** for numerous reference applications with various communication units or modules for different transmission media

All these documents as well as advisory services are available from the competent representative of Landis+Gyr.

7 Application of .MAP110 Functions

This section contains instructions for the use of functions of the Landis+Gyr .MAP110 Service Tool and for interpretation or further processing of results.

The selection of commands and their execution is described in section 5.4 "Command Tree" under "Command execution".

7.1 Read Commands

Section 12 "Functional Range per User Group" describes which read commands are available to the individual user groups. The following read commands are explained as examples:

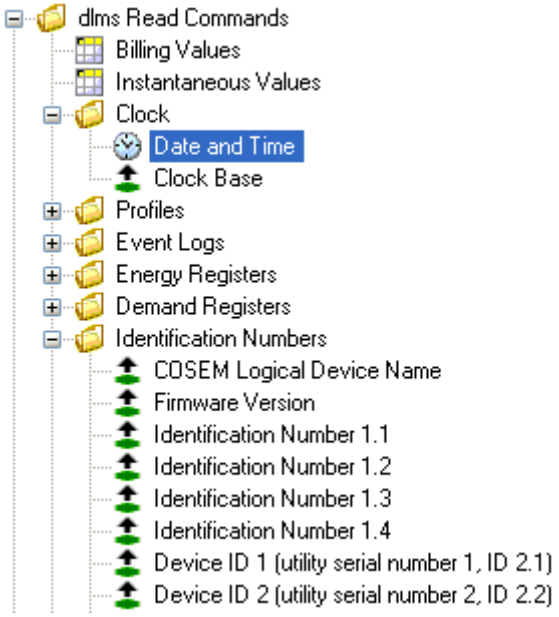
- Simple read commands for parameters and values
- Extended read commands
- Read commands for event logs
- Read commands for load profiles

Other read commands can be used in a similar way.

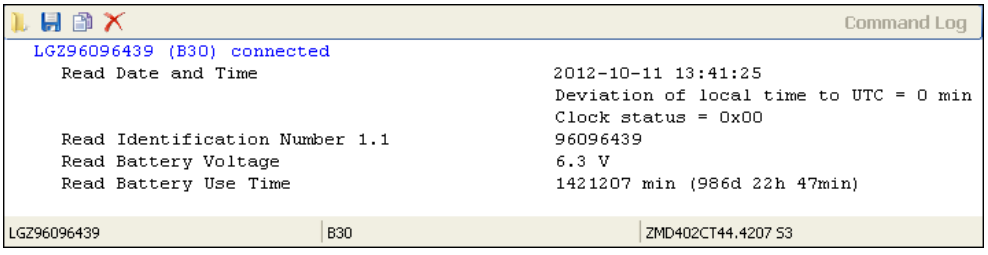
7.1.1 Simple Read Commands

Simple read commands read out an individual parameter or value from the device which is displayed in the trace window.

For execution, select the corresponding read command in the command tree marked with the symbol or .



The parameters or values read out each appear in a line in the command log window (command left, result right):



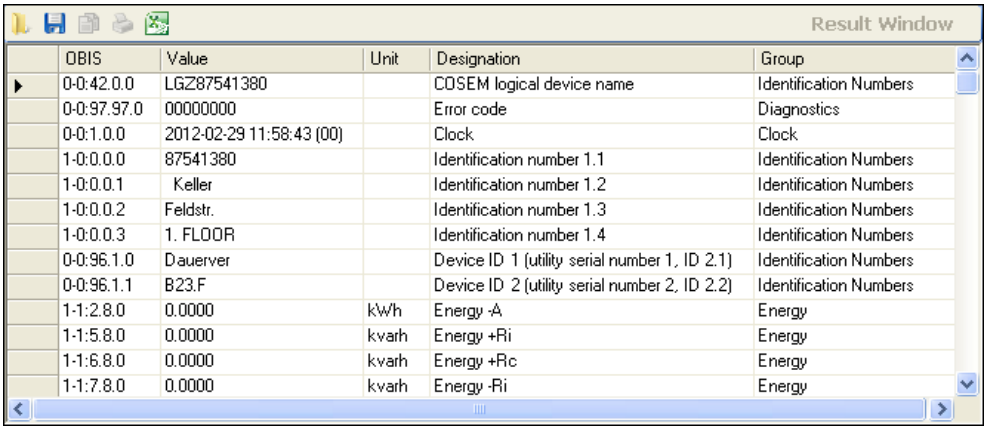
7.1.2 Extended Read Commands

For extended read commands, a table of values and parameters is read out from the device and displayed in the result window.

To execute, select the "Billing Values" or "Instantaneous Values" read command (dlms devices) or "Data Readout" (IEC devices) in the command tree.

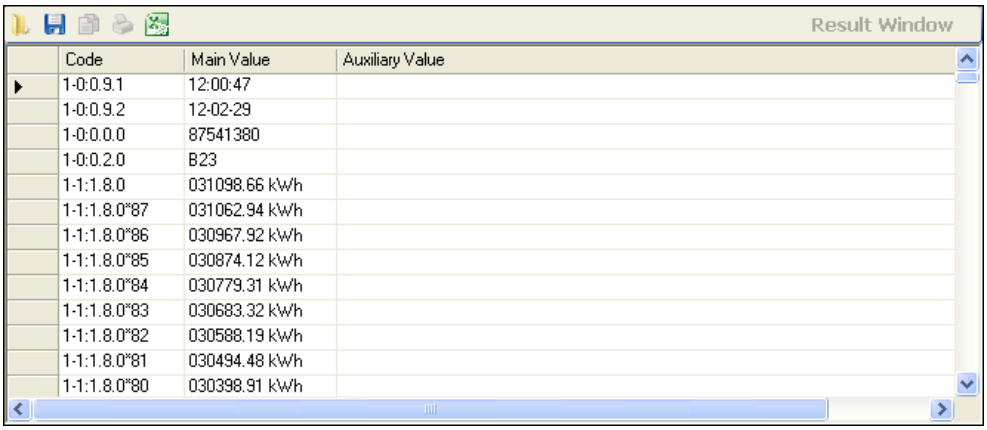
The table read out is shown in the result window. Each column of the table can be sorted in increasing or decreasing order by clicking on the relevant column heading. The table is sorted alphanumerically and the selected sorting sequence indicated in the column heading with an arrow pointing upwards for increasing or downwards for decreasing sequence.

For readout according to dlms, the table contains the OBIS code for every value or parameter (see section 11 "OBIS Identification Codes"), the display value, the unit, exact designation and the group.



OBIS	Value	Unit	Designation	Group
0-0:42.0.0	LGZ87541380		COSEM logical device name	Identification Numbers
0-0:97.97.0	00000000		Error code	Diagnostics
0-0:1.0.0	2012-02-29 11:58:43 (00)		Clock	Clock
1-0:0.0.0	87541380		Identification number 1.1	Identification Numbers
1-0:0.0.1	Keller		Identification number 1.2	Identification Numbers
1-0:0.0.2	Feldstr.		Identification number 1.3	Identification Numbers
1-0:0.0.3	1. FLOOR		Identification number 1.4	Identification Numbers
0-0:96.1.0	Dauerver		Device ID 1 (utility serial number 1, ID 2.1)	Identification Numbers
0-0:96.1.1	B23.F		Device ID 2 (utility serial number 2, ID 2.2)	Identification Numbers
1-1:2.8.0	0.0000	kWh	Energy -A	Energy
1-1:5.8.0	0.0000	kvarh	Energy +Ri	Energy
1-1:6.8.0	0.0000	kvarh	Energy +Rc	Energy
1-1:7.8.0	0.0000	kvarh	Energy -Ri	Energy

With readout according to IEC the table contains the code (identification value) for every value or parameter, the main value and where present an auxiliary value (e.g. date and time for demand values).



Code	Main Value	Auxiliary Value
1-0:0.9.1	12:00:47	
1-0:0.9.2	12-02-29	
1-0:0.0.0	87541380	
1-0:0.2.0	B23	
1-1:1.8.0	031098.66 kWh	
1-1:1.8.0*87	031062.94 kWh	
1-1:1.8.0*86	030967.92 kWh	
1-1:1.8.0*85	030874.12 kWh	
1-1:1.8.0*84	030779.31 kWh	
1-1:1.8.0*83	030683.32 kWh	
1-1:1.8.0*82	030588.19 kWh	
1-1:1.8.0*81	030494.48 kWh	
1-1:1.8.0*80	030398.91 kWh	

The table can be saved as XML or text file for further processing or exported directly to the Excel table calculation program (see section 5.5 "Result Window").

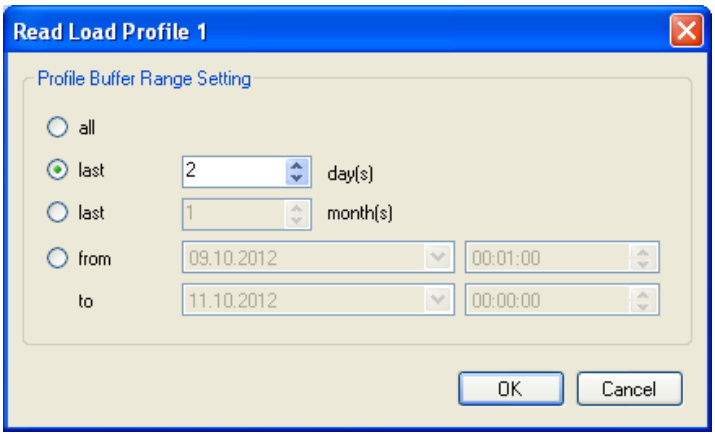
7.1.3 Read Commands for Profiles

With read commands for profiles (event logs, load profiles etc.) the profile memory is read from the device and shown in the result window.

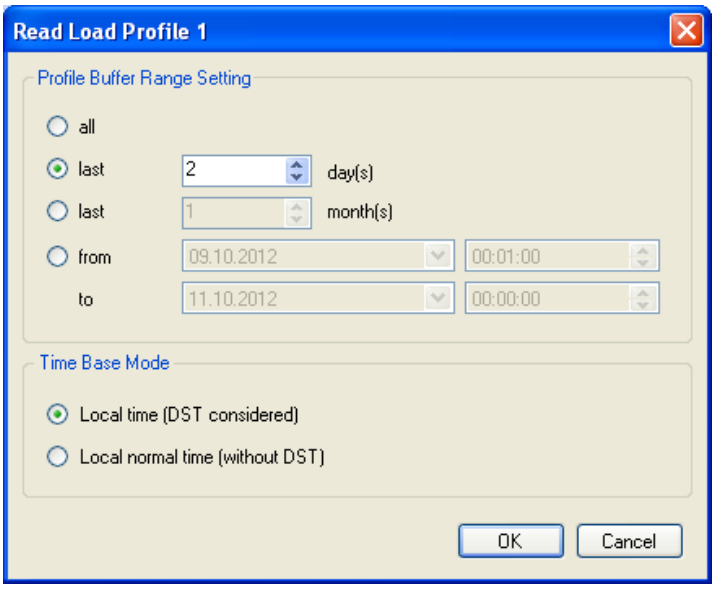
For execution, select a "Profiles" or "Event Logs" read command in the command tree.

The profile range to be read out can be specified in a dialogue window:

- all (default)
- last x days (with x entered)
- last x months (with x entered)
- from a specific starting date to a specific final date



For devices that support this feature, the desired time base (with or without daylight saving time) can be chosen additionally:

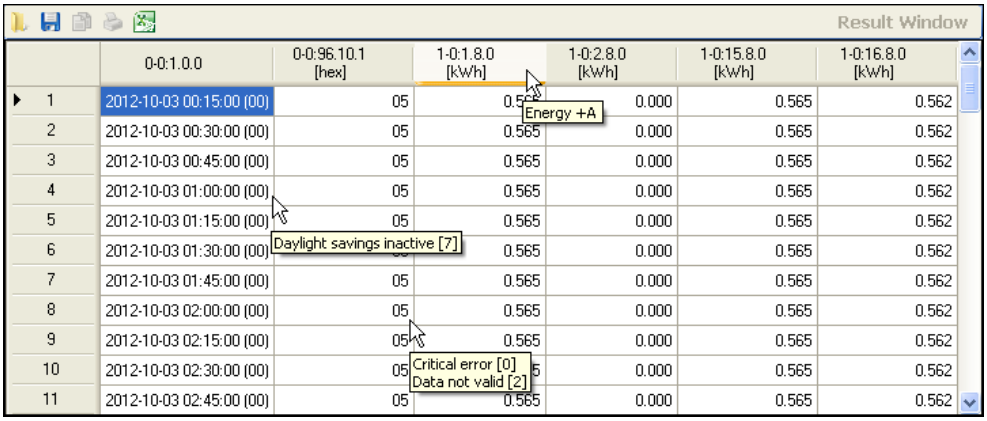


Shortening readout time by data selection
It is highly recommended to perform a data selection before readout of load profiles, since readout of the entire profile can take a considerable time (above all if the device has a short integrating period).

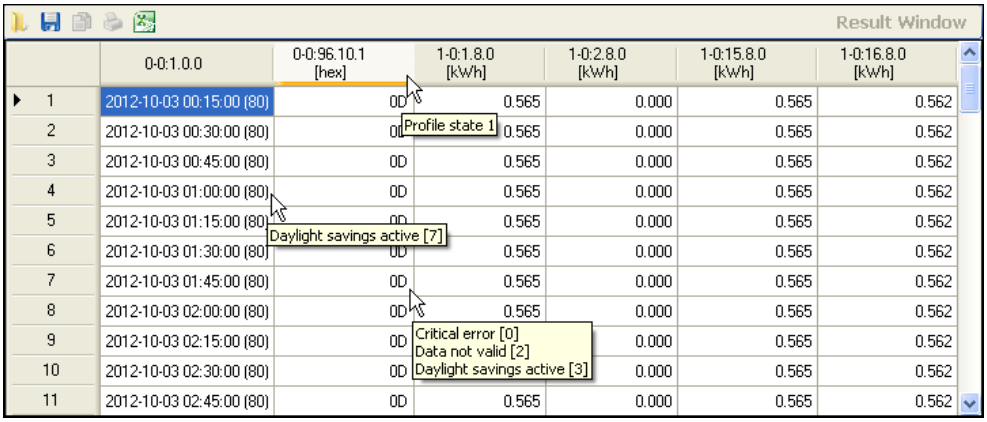
The profile data read out is shown as a table in the result window. With readout by dlms, the table contains for instance for a load profile the date and time-of-day, profile status word and the register status recorded for

every integrating period. An explanatory text is displayed by positioning the mouse pointer on a column heading or cell. For example the significance of the coded profile status word are decoded directly and all individual events displayed.

Example 1: Readout by dlms of a load profile (time base: local normal time without DST).

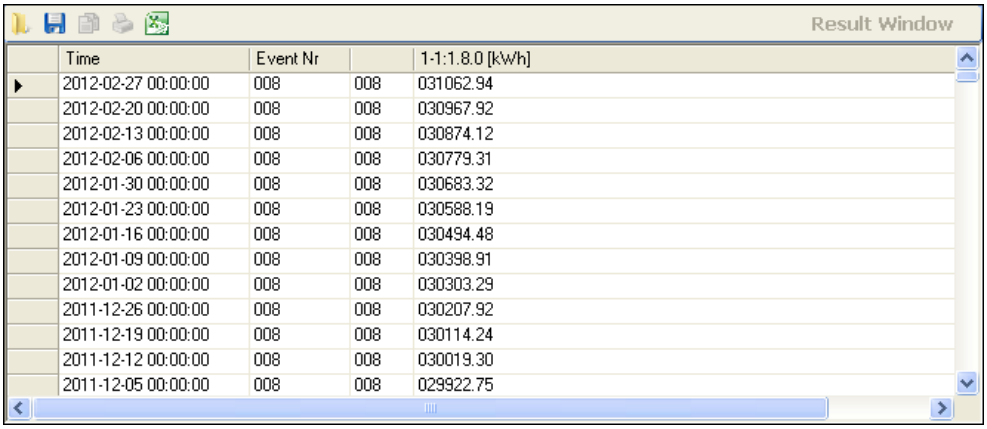


Example 2: Readout by dlms of a load profile (time base: local time with DST).



With readout according to IEC the table contains the same data for every profile entry as for readout under dlms, although they are shown slightly differently (e.g. preceding zeros).

Example 3: Readout according to IEC of an event log.



The table can be saved as XML or text file for further processing or exported directly to the Excel table calculation program (see section 5.5 "Result Window").

Event types and event numbers

A complete list with details, which event types can be recorded under which event number in the event log, is contained in the functional descriptions of the devices.

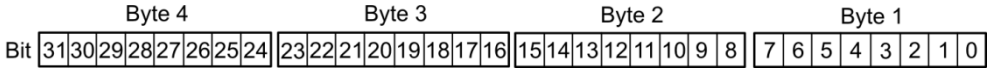
Profile status word

A complete list with details, which individual events are displayed under what numbers (corresponding to the bit of the status word) is also contained in the functional descriptions of the devices.

The profile status word indicates the current status of the device and the network it is connected to.

The profile status word has a size of 4 bytes and can be restricted to 2 bytes by parameterisation with the Landis+Gyr MAP120. In this case only the bytes 1 and 2 (bits 0 to 15) are available. In the IEC readout only the bytes 1 and 2 will be included no matter the parameterisation.

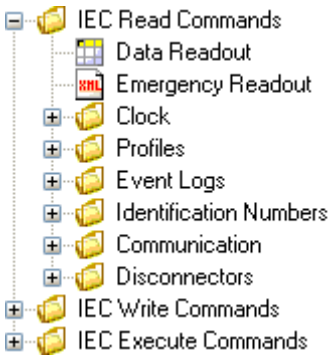
Bit assignment in profile status word:



7.1.4 Emergency Readout

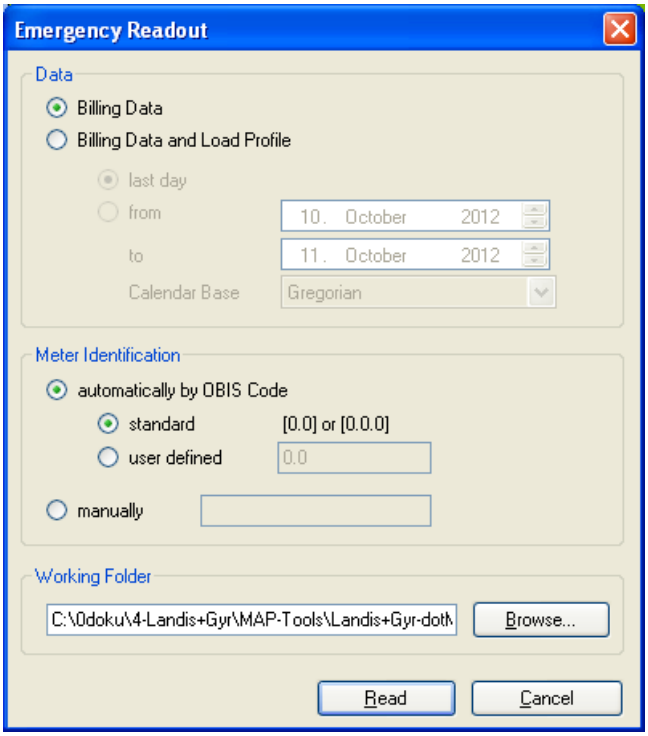
With the read command for emergency readout the device data can be read out into a XML file, e.g. if communication between the central system and the device fails (for IEC protocol only). This XML file can be imported later on into the Landis+Gyr automatic device reading system "Converge".

For execution, select the read command for emergency readout in the command tree marked with the symbol .



The following data can be specified in a dialogue window:

- read out only billing data or billing data and load profile in the range specified
- device identification automatically by OBIS code contained in the billing data or manually
- working folder, where the XML file shall be saved



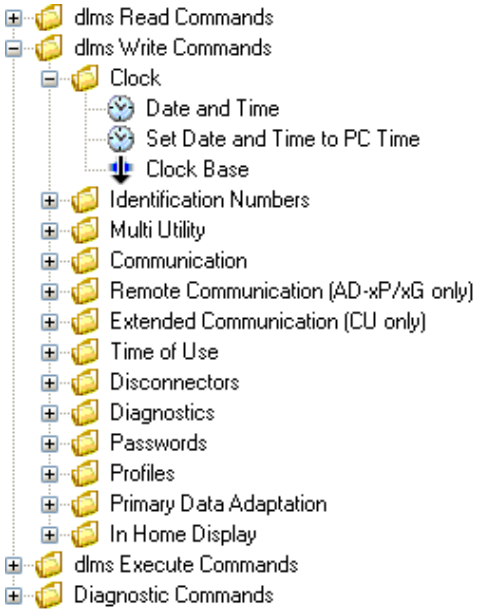
After clicking **Read** the selected data will be saved into a XML file in the working folder specified.

The file name corresponds to the device identification, the extension is xml, e.g. "77708190.xml". If the same device is read out several times, the previous file is overwritten without warning.

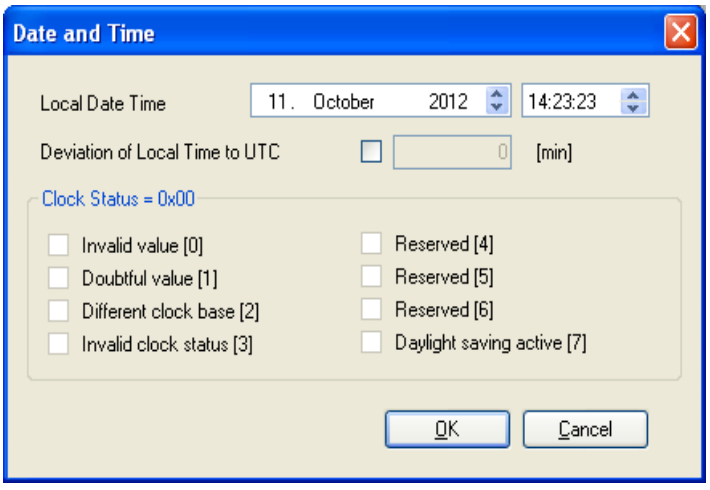
7.2 Write Commands

Section 12 "Functional Range per User Group" describes which write commands are available to the individual user groups.

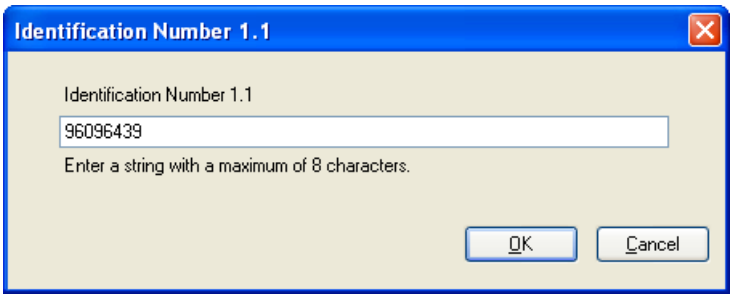
For execution, select the corresponding write command in the command tree marked with the symbol or .



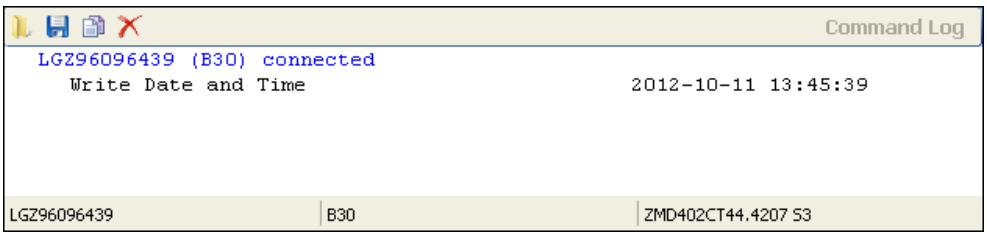
With write commands, the current parameter or value is always read out first from the device and displayed in a dialogue window for modification, e.g. for setting time and date:



or for writing an identification number:



Modify the data displayed and then click on **Ok**. The modified data is written in the device and recorded in the command log window (command left, value right):



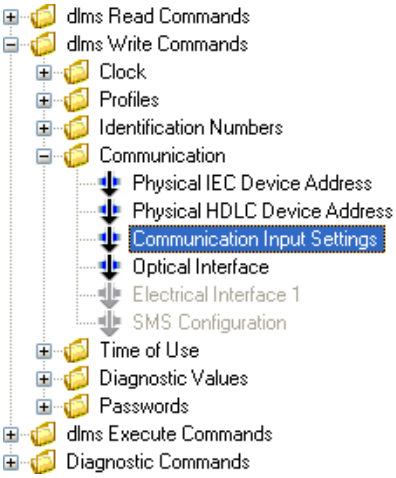
Further write commands are explained as examples in the following sub-sections.

With the execution of the following write commands, a MAP100 export file in MAP100 V2.0 format is generated and saved in the directory defined in the .MAP110 option settings (see section 7.5.9 "Enabling MAP100 File Export"), if the function is activated:
- Parameterisation ID
- Passwords level 1, 2 and E
- Time of use (TOU)
- Billing period reset.

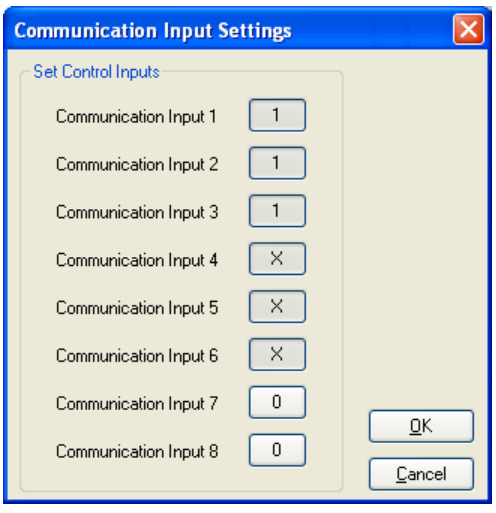
These write commands are recognisable in the command tree from the green plus sign added to the icon, e.g. Parameterisation ID.

7.2.1 Set Communication Inputs

For execution, select the "Communication Input Settings" write command in the "Communication" folder of the command tree.



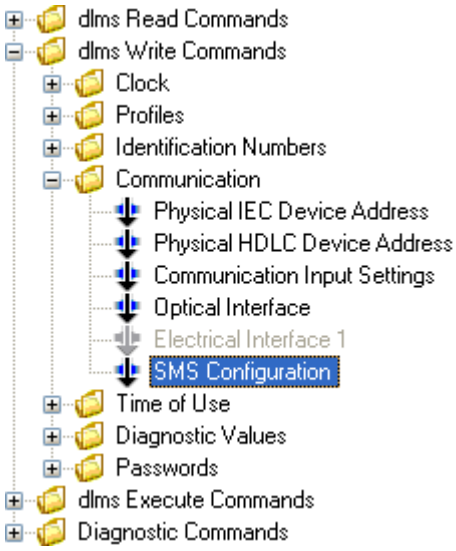
All communication inputs are displayed in the dialogue window. By clicking on a field you can toggle between 0, 1 and X (value remains the same).



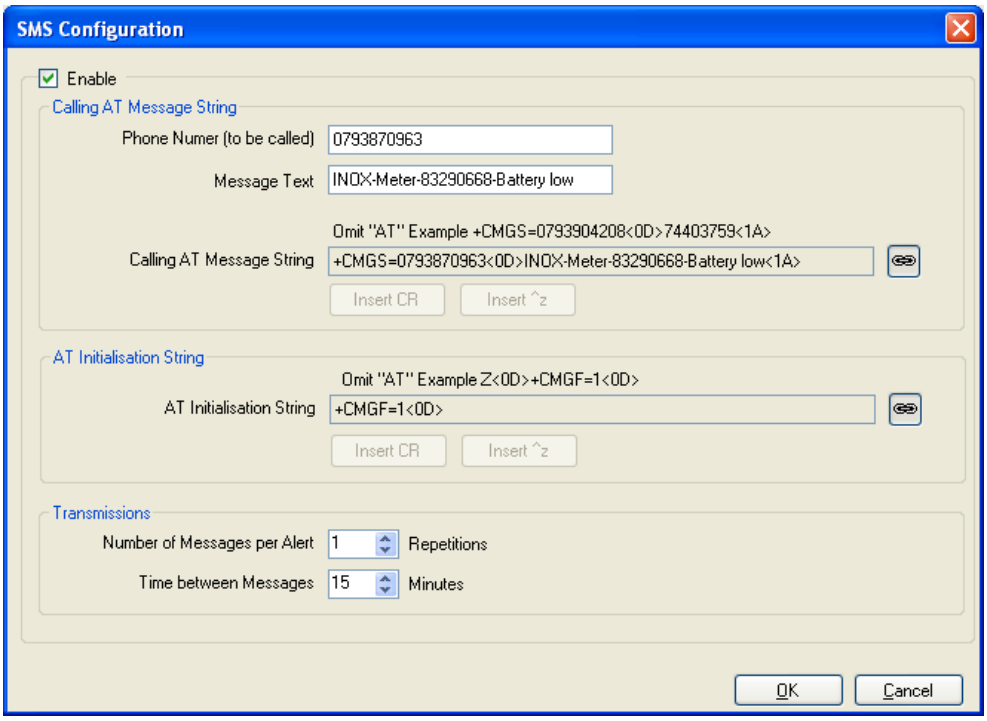
Click on **OK** to write the values set into the device.

7.2.2 Modify SMS Configuration Settings

For execution, select the "SMS Configuration" write command in the "Communication" folder of the command tree.



The SMS configuration data is displayed in the dialogue window. You can modify the phone number, the message text, the initialisation string and the transmission parameters.

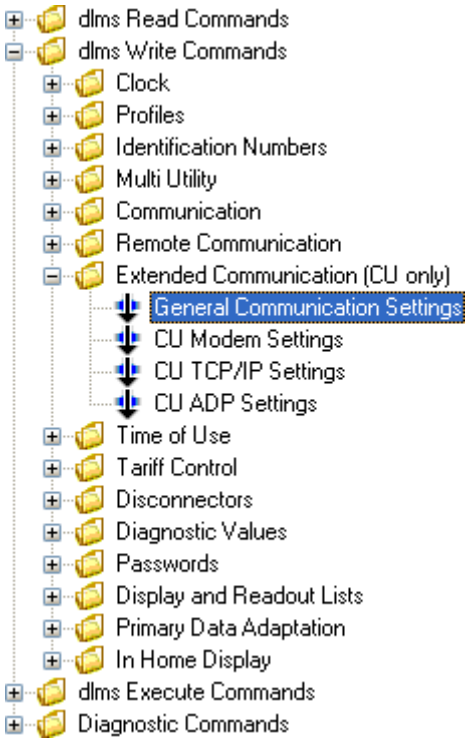


Click on **OK** to write the values set into the device.

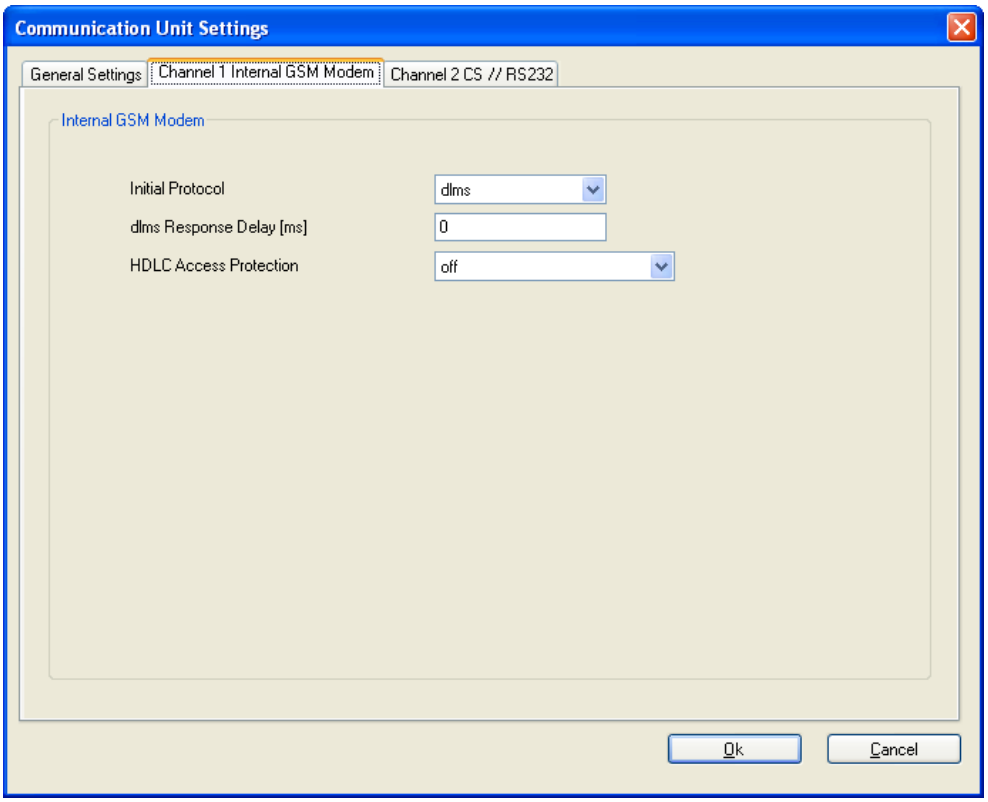
You can check the settings with the execute command "SMS Test" (see 7.3.1 "SMS Test Transmission").

7.2.3 Modify Communication Unit Settings

The write commands in the folder "Extended Communication (CU only)" of the command tree allow you to modify the settings of communication units and communication unit adapters (ADP).



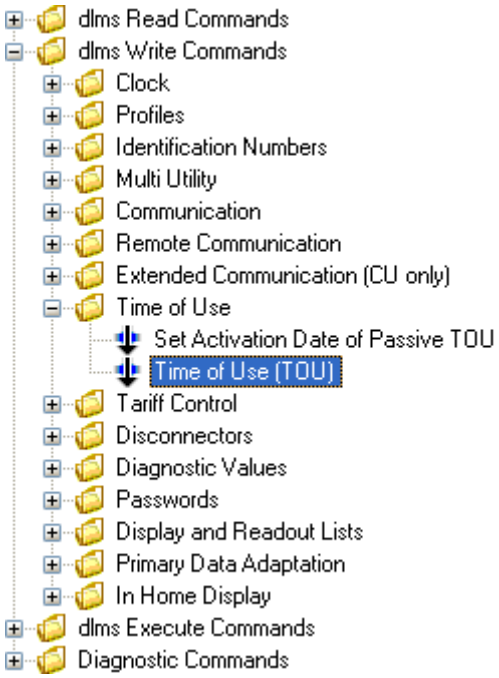
In the dialogue window you can modify the corresponding communication settings, e.g. the modem configuration of a communication unit with GSM/ GPRS modem, as shown in the following figure.



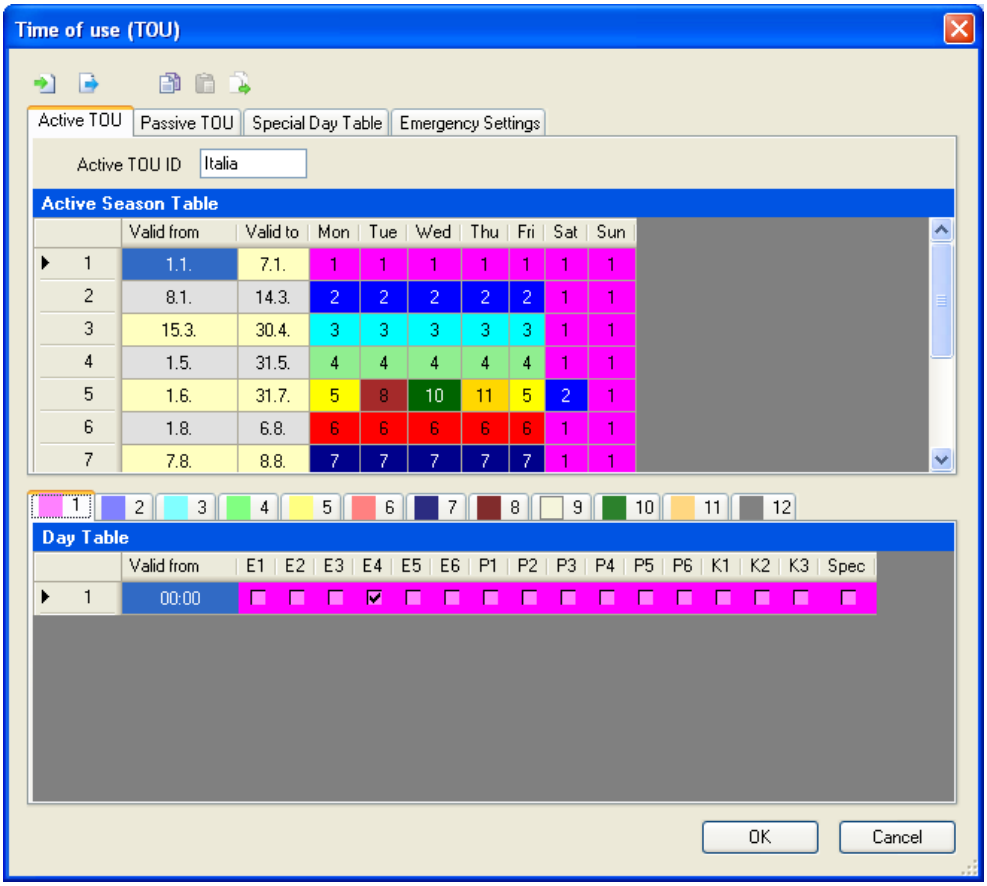
Click on **OK** to write the values set into the communication unit.

7.2.4 Modify Time of Use

For execution, select the "Time of use (TOU)" write command in the "Time of Use" folder of the command tree.



In the dialogue window "Time of use (TOU)" you can modify the TOU read out from the device and write it back again into the device. You can also save a read out TOU in a XML file or load a saved XML file into the .MAP110 to write it into the device.



Clicking on  opens the "Save as" dialogue window to save the TOU in a freely selected directory as XML file.

Clicking on  opens the "Open File" dialogue window to load a TOU saved in a XML file.

Clicking on  copies the active TOU into the passive TOU.

You can also copy the entire TOU or an individual table to the Windows clipboard to paste it afterwards into the TOU of another device connected to the .MAP110 and write it into this device. The TOU of the different device families are thereby exchangeable among themselves.

Clicking on  copies the entire TOU from the .MAP110 to the Windows clipboard.

Clicking on  copies an individual table from the Windows clipboard into the .MAP110.

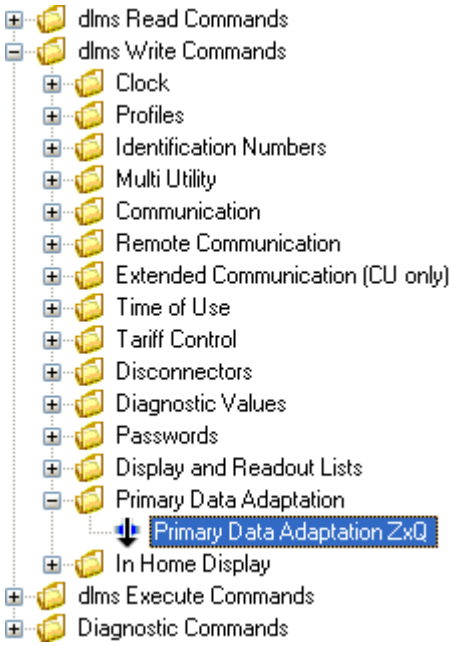
To copy an individual table to the Windows clipboard or to paste it from the Windows clipboard, click in the "Time of use (TOU)" dialogue window on a table and then select the corresponding copy or paste command in the pop-up menu appearing.

Via the Windows clipboard it is also possible to import an entire TOU from a Landis+Gyr .MAP120 Parameter Editor. The transfer in the opposite direction from .MAP110 to .MAP120 is however not supported.

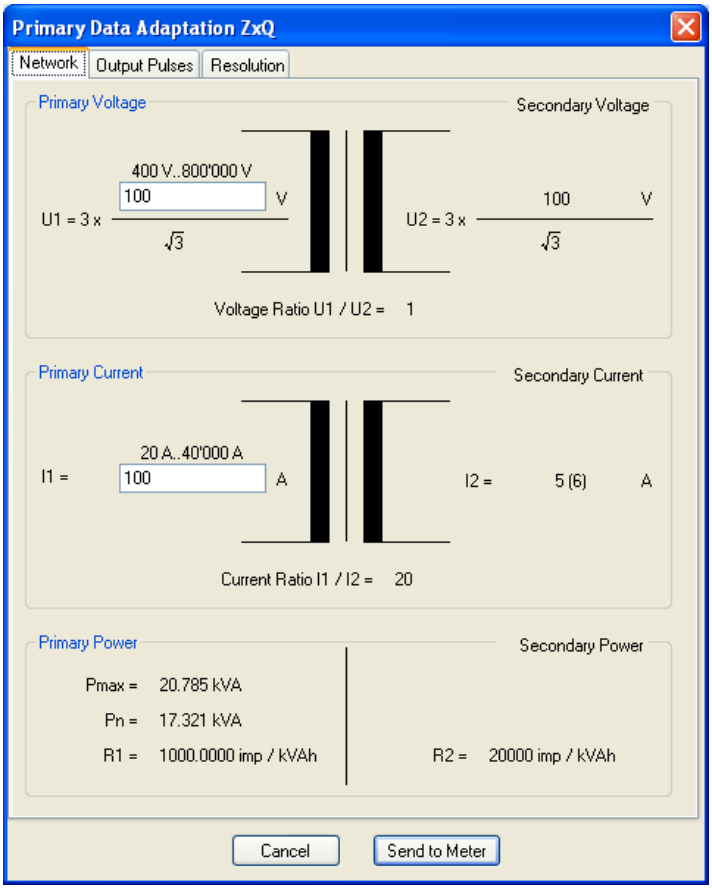
Click on **OK** to write the modified or imported TOU into the device. Afterwards the "Time of use (TOU)" dialogue window disappears again.

7.2.5 Primary Values Adaptation

For execution, select the "Primary Data Adaptation" write command in the "Primary Data Adaptation" folder of the command tree.



In the dialogue window you can modify the primary value adaptation settings of transformer connected devices.

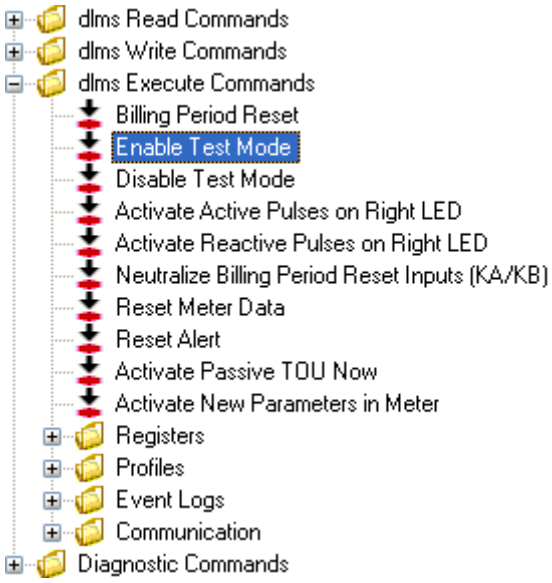


Click on **Send to Meter** to write the values set into the device.

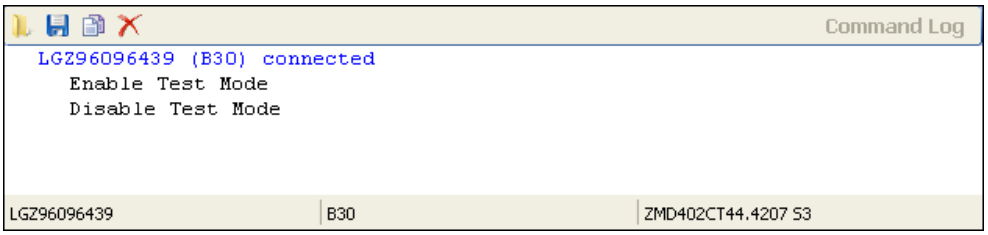
7.3 Execute Commands

Section 12 "Functional Range per User Group" describes which execute commands are available to the individual user groups.

For execution, double click the relevant execution command in the command tree marked with the symbol .

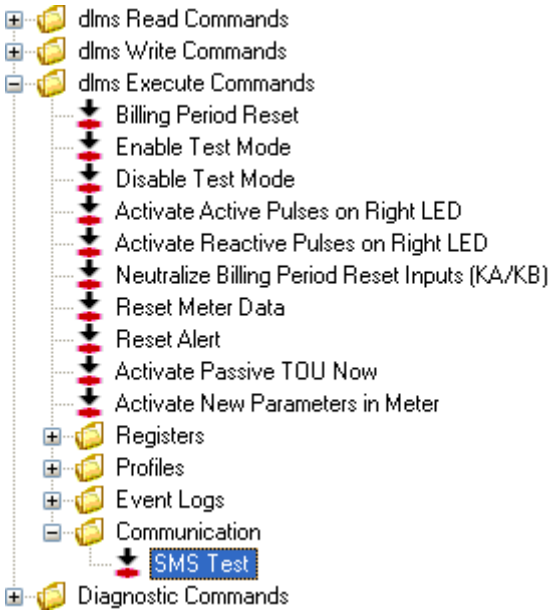


The execute command is normally transmitted to the device without additional dialogue (exception: see 7.3.1 "SMS Test Transmission") and executed there. The commands executed are recorded in the command log window:

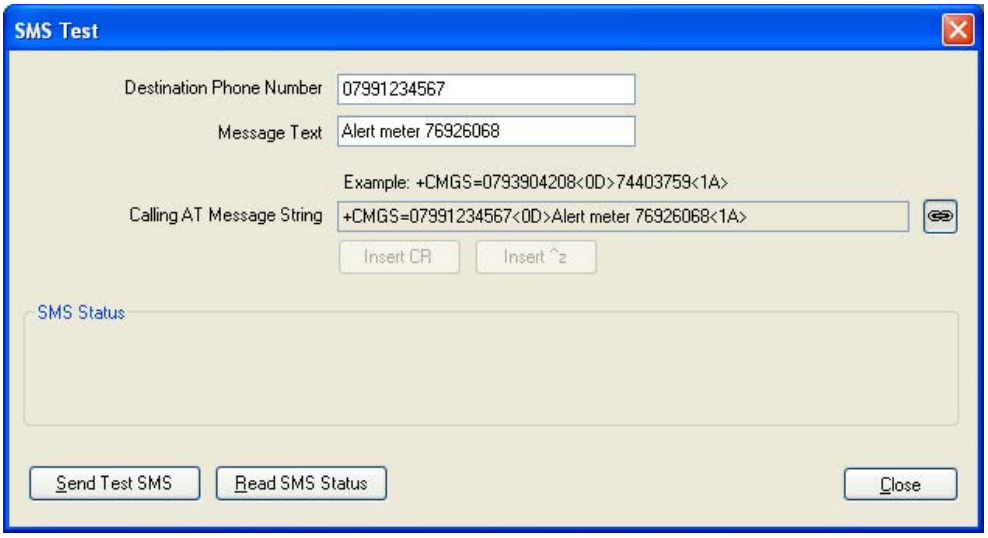


7.3.1 SMS Test Transmission

For execution, select the "SMS Test" execute command of the command tree.



The "SMS Test" dialogue window appears. In this window you can enter the phone number to be called and the message text of the test SMS.



Click on **Send Test SMS** to send the Test SMS.

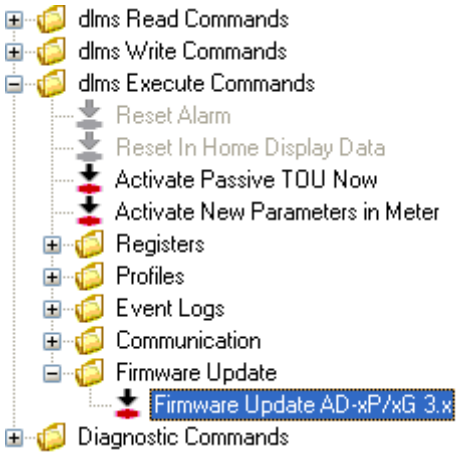
By clicking on **Read SMS Status** you can display the SMS status.

7.3.2 Firmware Update AD-xP/xG

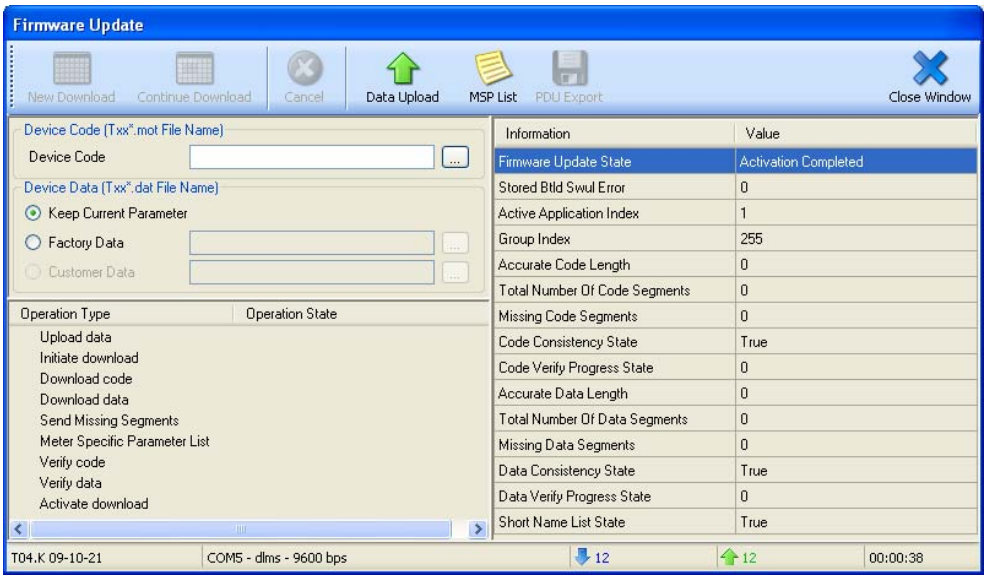
This execute command is only applicable for communication modules AD-xP/xG version 3.x.

Additional knowledge required
Additional knowledge is required to apply this execute command. The following information provides only an overview about this command. Please contact your sales representative to receive further information about this command.

For execution, select the "Firmware Update AD-xP/xG 3.x" execute command of the command tree.



The "Firmware Update" window appears.



Enter the name of the MOT file with the new firmware version in the entry field "Device Code" or select a file in the "Select Device Code File" window, which appears after clicking on ...

In the "Device Data" area, select whether the current parameters shall be kept or whether a factory parameterisation shall be executed. Enter the name of the DAT file in the entry field "Factory Data" for the factory parameterisation or select a file in the "Select Factory Data File" window, which appears after clicking on ...

Afterwards the button 

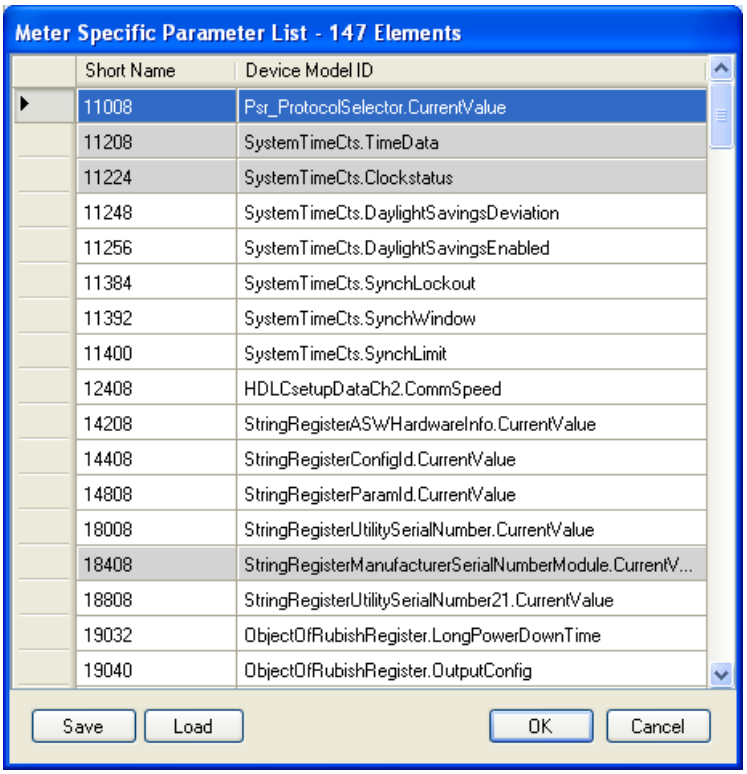
is activated and can be used to download the new firmware version into the device.

Clicking on 

reads the data from the device and saves the data in a DAT file.

Clicking on 

reads a device specific parameter list from the device and displays this in a window.

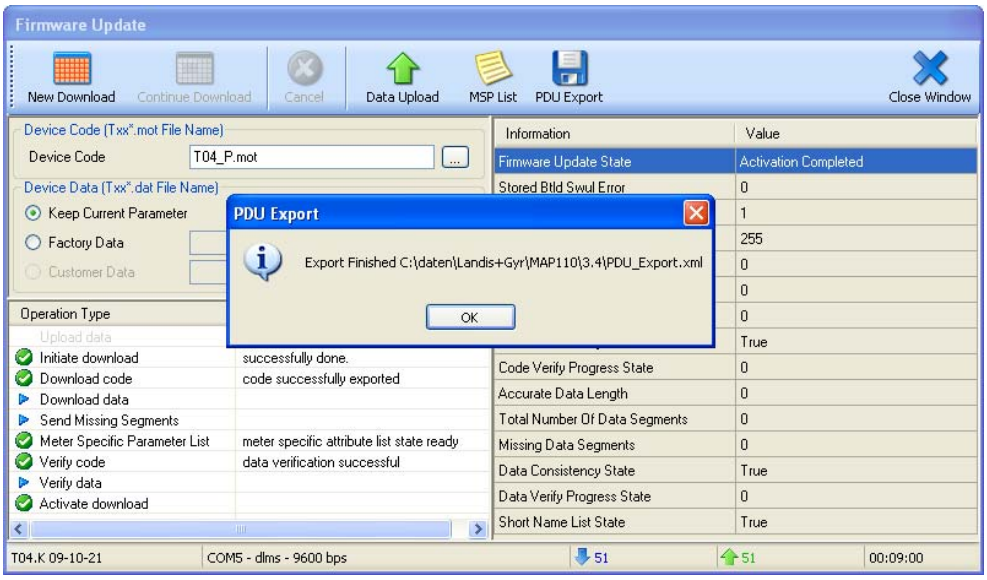


The list can be edited by deleting entries or by adding new entries at the end of the list. Click on **Save** to save the list as XML file.

Clicking on 

exports the device data as Protocol Data Unit (PDU) in an XML file.

The operation types and operation states are displayed in the "Firmware Update" window.



The icons in column "Operation Type" have the following signification:

- indicates a process not yet executed.
- indicates a running process.
- indicates a process successfully terminated.
- indicates a failed process.

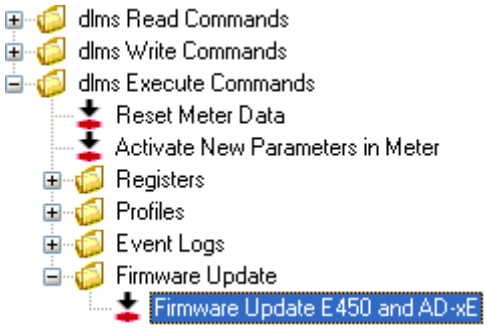
7.3.3 Firmware Update E450 and AD-xE

This execute command is only applicable for E450 meters and communication modules AD-xE.

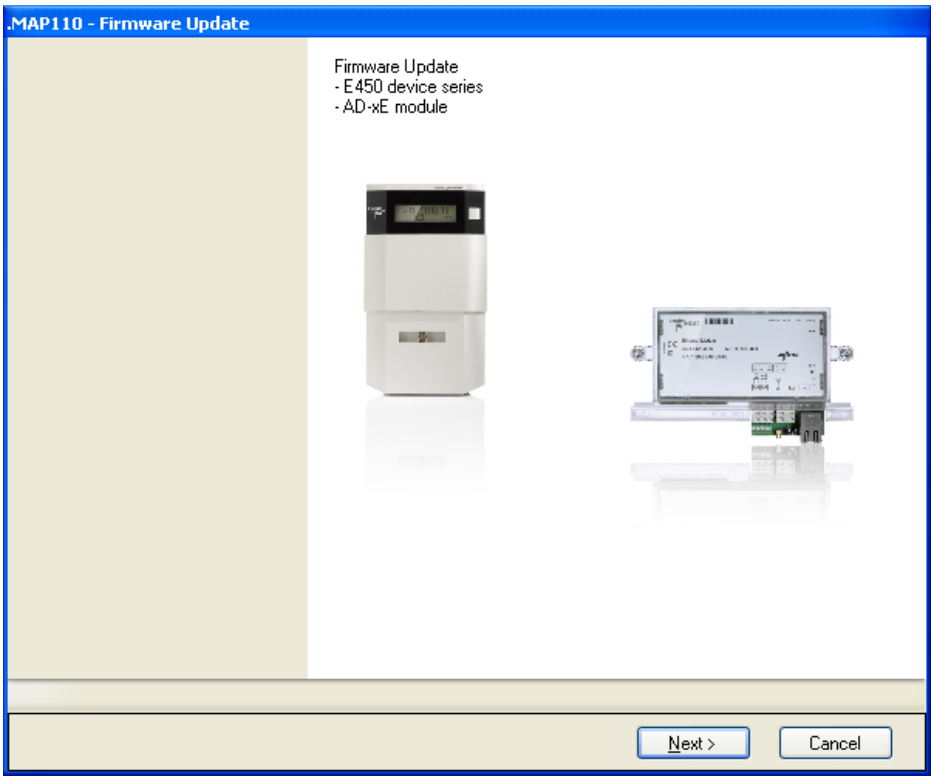
Additional knowledge required
Additional knowledge is required to apply this execute command. The following information provides only an overview about this command. Please contact your sales representative to receive further information about this command.

Required firmware file
A binary file with the new firmware version of the device is required for the firmware update. This binary file (e.g. V03.02.03.00.bin) provided by Landis+Gyr has to be stored in any directory of your computer. The .MAP110 Service Tool generates an image file with the data of the binary file.

For execution, select the "Firmware Update E450 and AD-xE" execute command of the command tree.

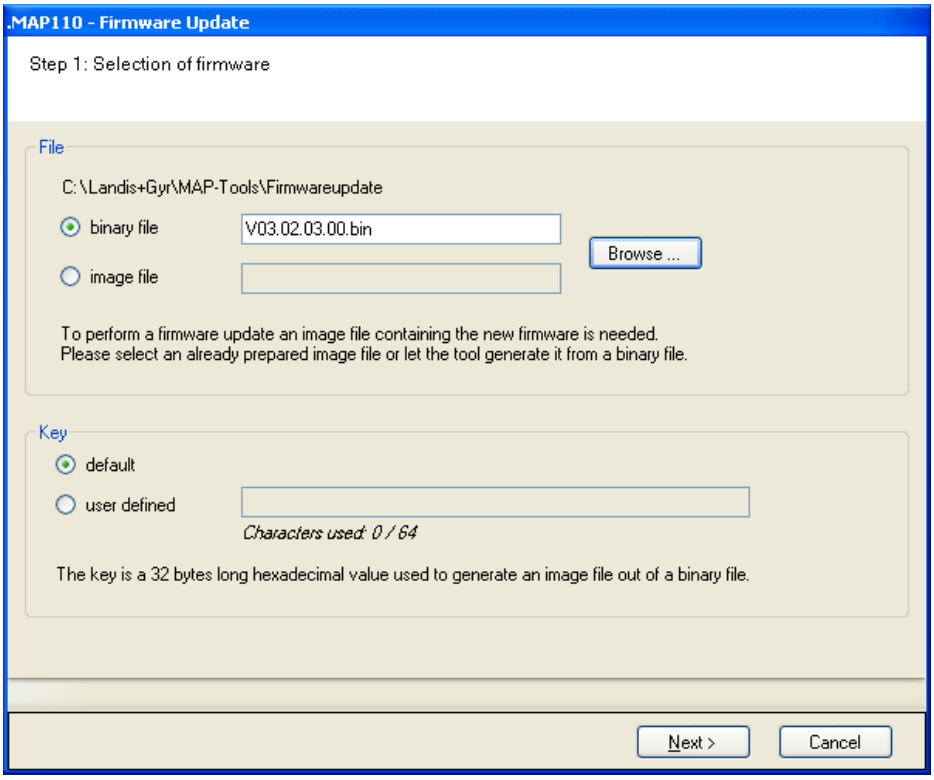


The Update Wizard "Firmware Update" appears.

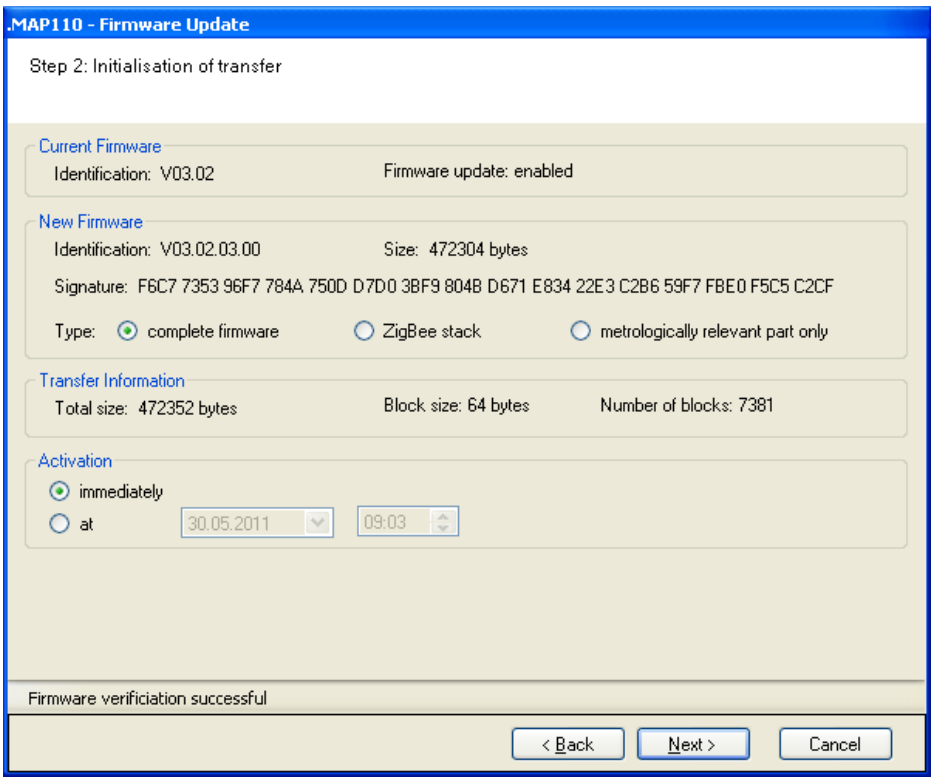


This Wizard guides you through the update process:

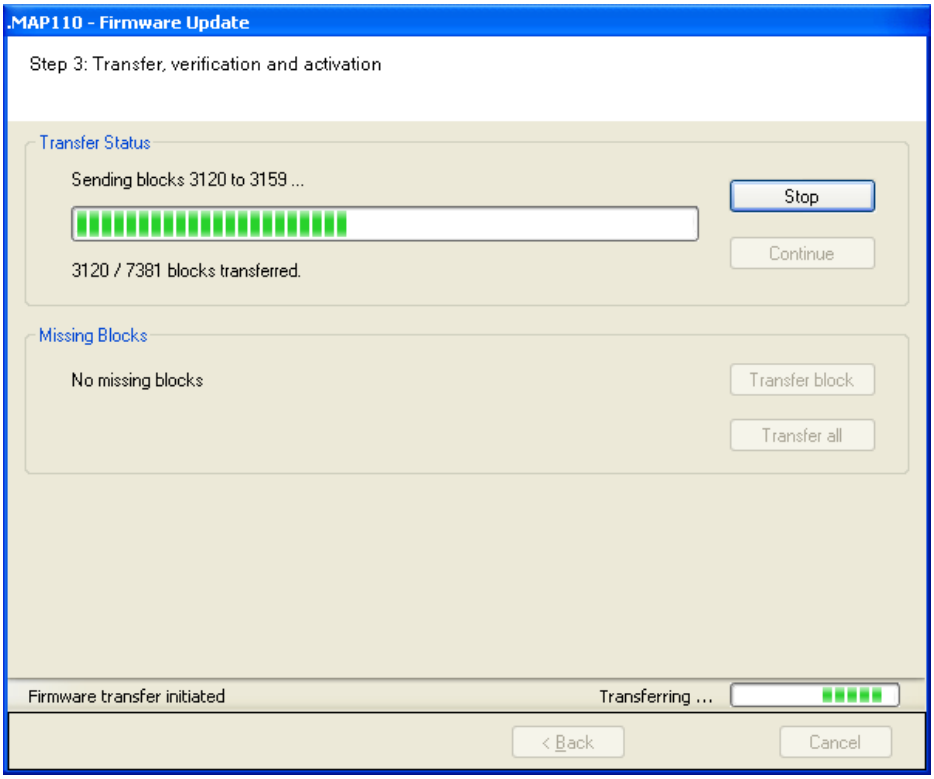
1. Click on **Next >**.
   The screen "Step 1: Selection of firmware" appears with preselected options "binary file" in the "File" area and "default" in the "Key" area.
2. Click on **Browse** and in the appearing "Open" window select the binary file received from Landis+Gyr and stored on your computer.
   The path and name of the selected binary file will be displayed.



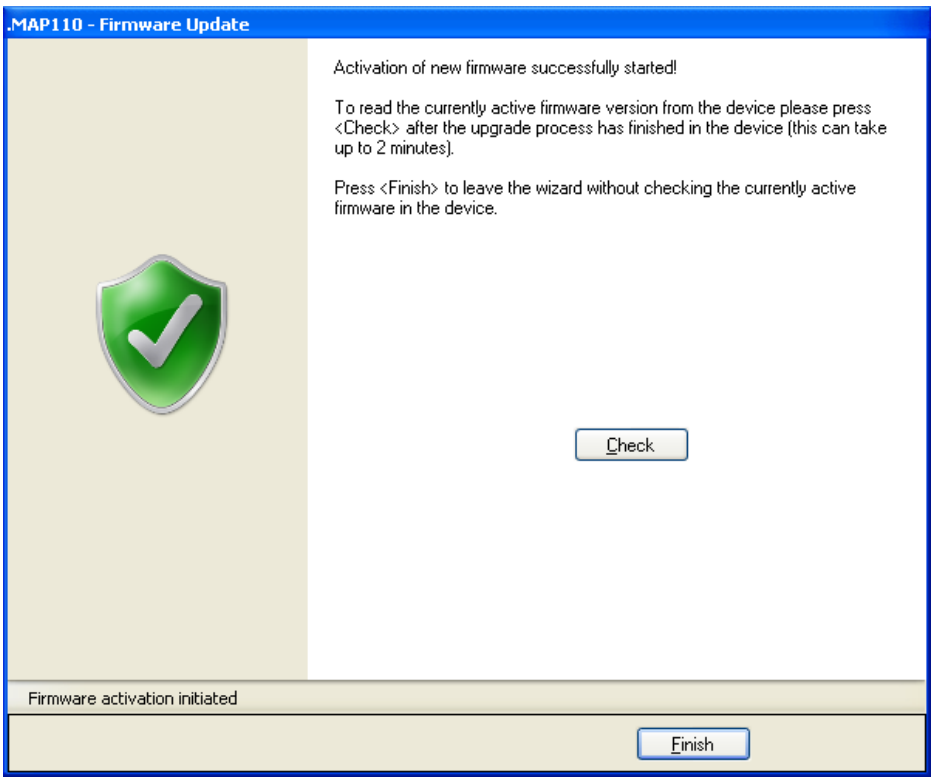
   If you have received instead of a binary file an image file from Landis+Gyr, you can click on the option "image file" and select the image file instead of the binary file.
3. Select the option "user defined" if you want to use a user defined key for signing the image file to be generated from the binary file instead of the device family specific standard key and then enter your key of exactly 256 bit length (64 characters) in hexadecimal form.
   The "Key" area is only activated if the option "binary file" is selected in the "File" area.
4. Click on **Next >**.
   An image file is generated from the binary file and signed with the selected key.
   The screen "Step 2: Initialisation of transfer" appears.
   The following data about the firmware will be displayed: :
   – Identification of the currently loaded firmware in the device
   – Identification, size and signature of the new firmware
   – Total size, block size and number of blocks of the new firmware.
5. In the "New Firmware" area select whether the complete firmware or only the ZigBee stack or the metrologically relevant part of the firmware is to be updated.
6. In the "Activation" area select whether the firmware shall be activated immediately after the transfer or at a later point in time to be entered.



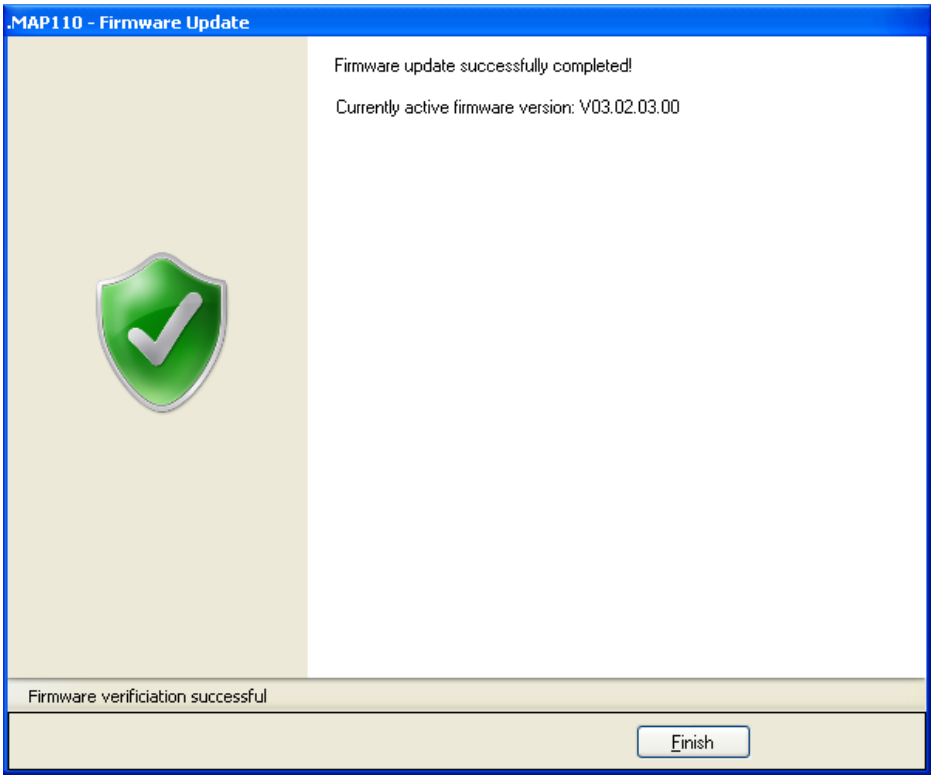
7. Click on **Next >**.
   The screen "Step 3: Transfer, verification and activation" appears and the new firmware is transferred to the device. The progress is indicated in the "Transfer Status" area.



   Wait until all blocks are transferred and verified and the subsequent firmware activation is started. Then the following display appears:



8. Click on **Check**.
   The wizard starts polling the device every 5 seconds and as soon the communication is possible the currently active firmware version is read from the device. The designation of button **Check** changes to **Stop**. With this button the check can be aborted. Please note that the activation of a new firmware can take several minutes. During this time no communication with the device is possible. After the check the following display appears:



9. Click on **Finish**.
   This concludes the firmware update.

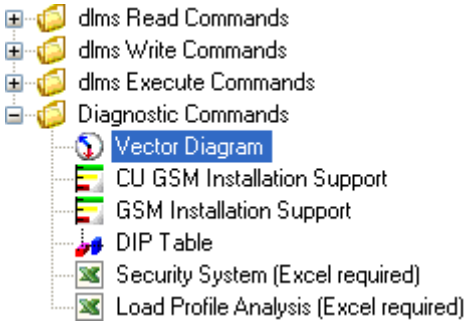
7.4 Diagnostic Commands

Section 12 "Functional Range per User Group" describes which diagnostic commands are available to the individual user groups.

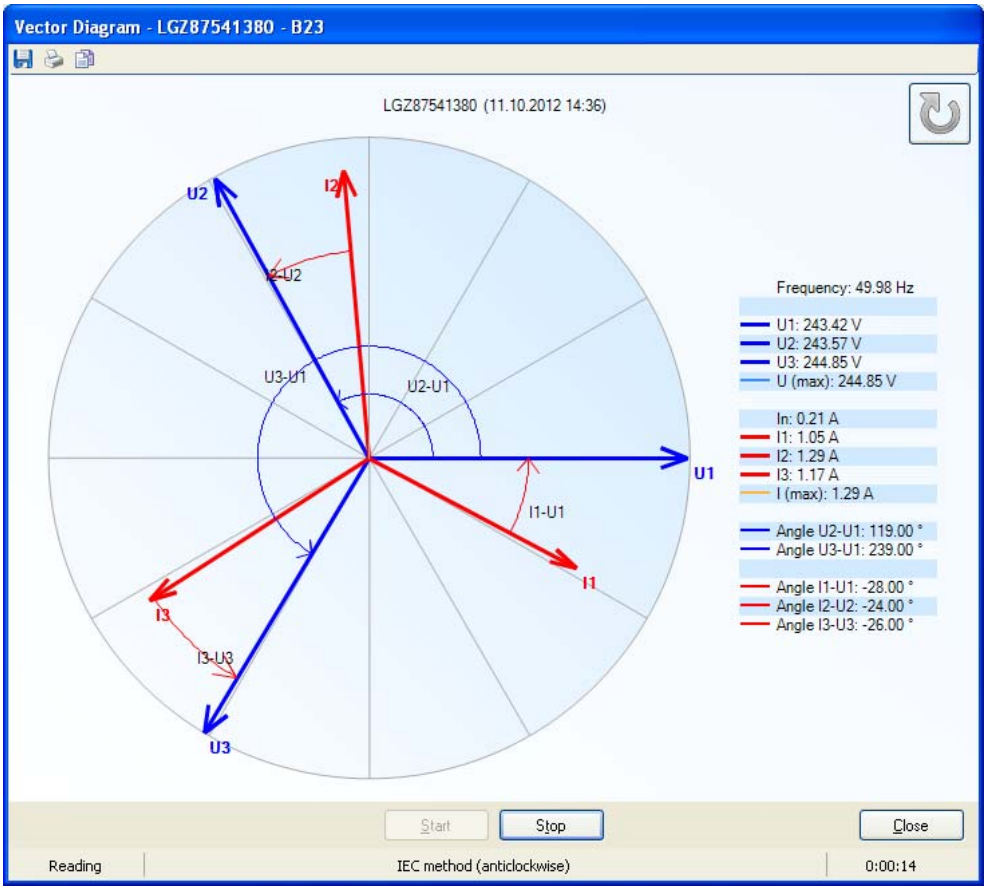
7.4.1 Vector Diagram

A vector diagram of the currents and voltages of the device connected can be displayed with this diagnostic command.

For execution, select the "Vector Diagram" diagnostic command in the command tree.



A vector diagram is shown in the "Vector Diagram" window, which is calculated from the continuously read instantaneous values of voltages, currents and phase angles. The individual instantaneous values measured by the meter are displayed next to the diagram.



Clicking **Stop** interrupts a current readout of the instantaneous values.

Clicking  or  respectively, switches between the anticlockwise view to the clockwise view.

Clicking  opens the "Save as" dialogue window to save the data displayed in a freely selected directory as XML file.

Clicking  displays a print preview, from which the vector diagram can be printed on the standard printer.

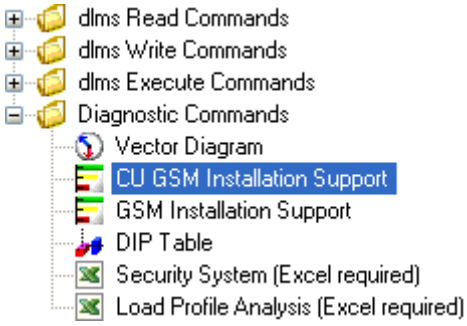
Clicking  copies the vector diagram to the Windows clipboard, from where it can be inserted in another application (e.g. in a word processing program).

The diagnostic command is ended with **Close**.

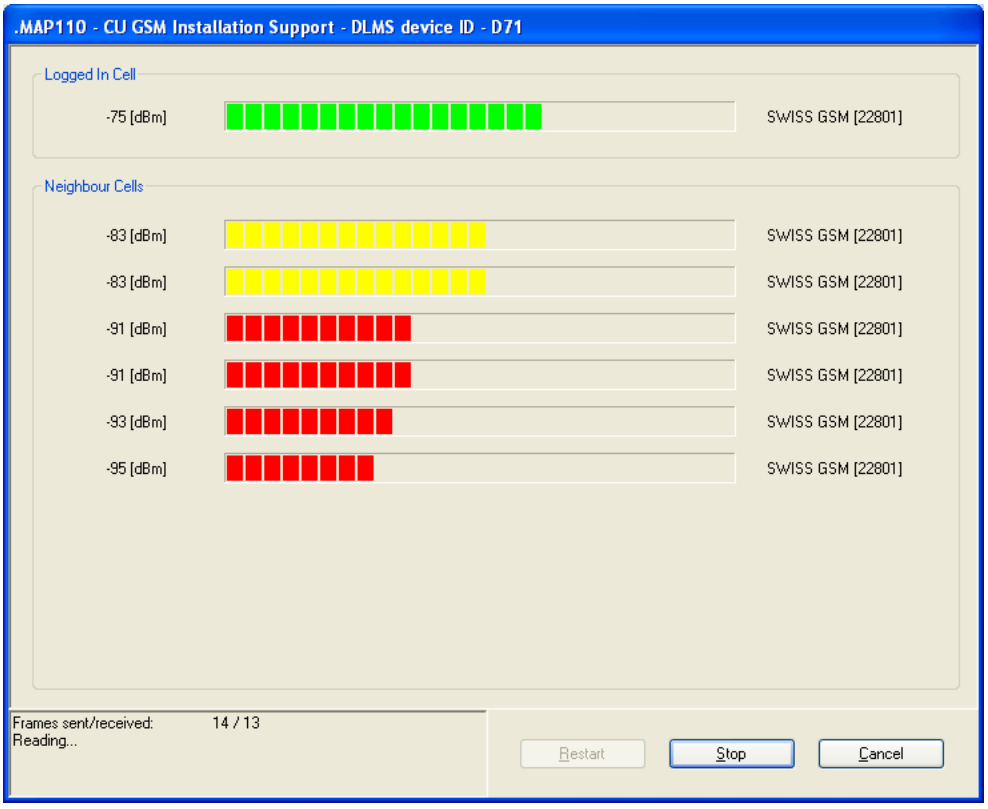
7.4.2 GSM Installation Support

This diagnostic command can only be used if the device connected has a communication unit with GSM modem or if an AD-FG/CG communication module is to be addressed.

For execution, select the "CU GSM Installation Support" or "GSM Installation Support" diagnostic command in the command tree.



The field strengths of the cell logged in and all neighbouring cells are displayed in the "GSM Installation Support" window. When used on the spot this allows the optimum antenna position to be determined or a check of the received field strength.



Measurement of field strength is

- continuously updated if the values are read out via device and optical head and no communication takes place simultaneously via the GSM channel, or
- not continuously updated if the values are read out via the GSM channel (in this case the values measured immediately after making the connection are displayed).

Clicking **Stop** interrupts a current measurement of field strength.

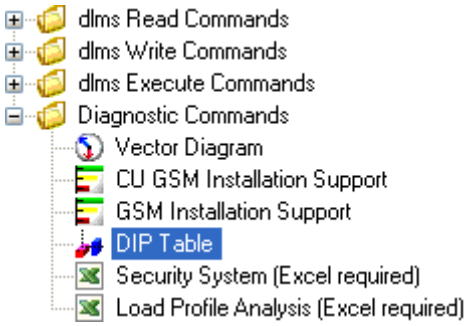
Clicking **Restart** repeats the interrupted measurement of field strength.

The diagnostic command is ended with **Cancel**.

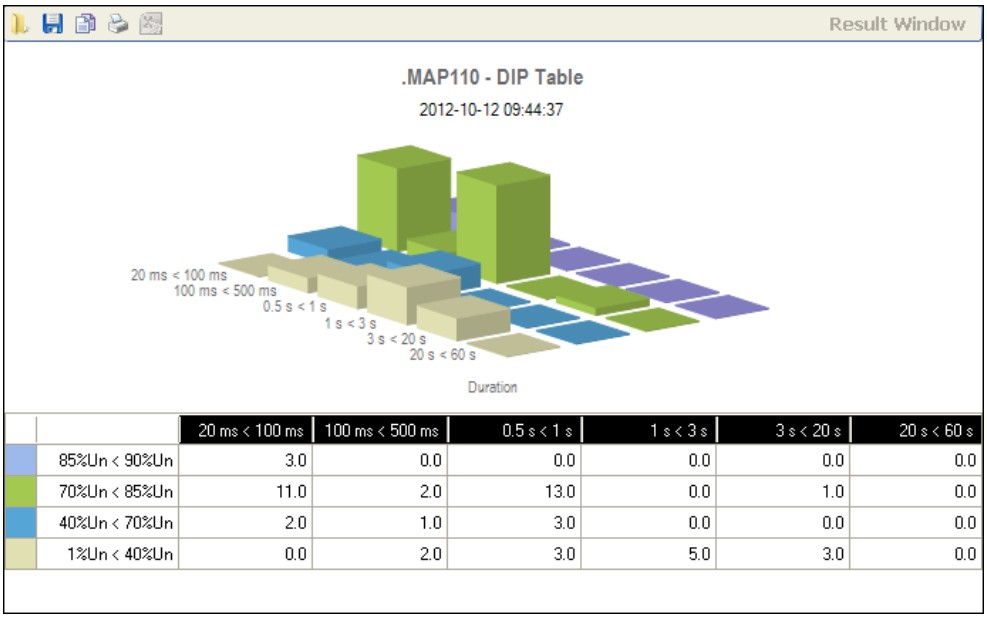
7.4.3 DIP Table

A graphic evaluation of all voltage failures occurring since the last deletion of the DIP table can be performed with this diagnostic command.

For execution, select the "DIP Table" diagnostic command in the command tree.



A diagram and a table with number, duration and category of voltage failures are shown in the result window.



	20 ms < 100 ms	100 ms < 500 ms	0.5 s < 1 s	1 s < 3 s	3 s < 20 s	20 s < 60 s
85%Un < 90%Un	3.0	0.0	0.0	0.0	0.0	0.0
70%Un < 85%Un	11.0	2.0	13.0	0.0	1.0	0.0
40%Un < 70%Un	2.0	1.0	3.0	0.0	0.0	0.0
1%Un < 40%Un	0.0	2.0	3.0	5.0	3.0	0.0

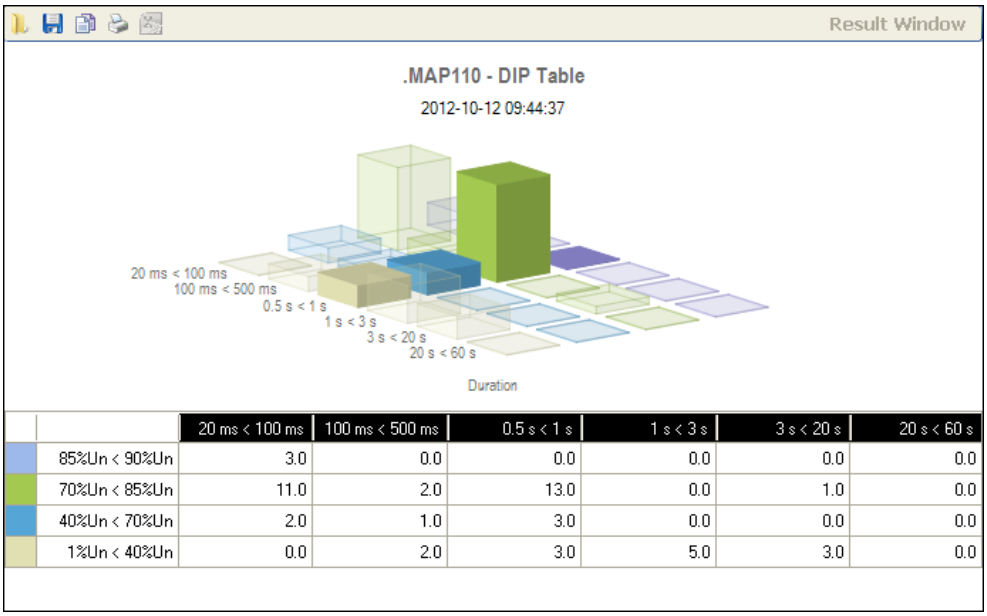
The categories, i.e. the severity of the voltage failures, are shown in colour, e.g. voltage failures of 1 to 40 % of rated voltage in violet. The table contains a line for each category, the diagram a series of bars in the x-direction.

The number of voltage failures occurring is shown in the table as numeral and in the diagram as bar height.

The duration of the voltage failures is divided into four ranges: 20 to 100 ms, 100 to 500 ms, 0.5 to 1 s, 1 to 3 s, 3 to 20 s and 20 to 60 s. The table contains a column for each range, the diagram a series of bars in the y-axis with bars of different colour.

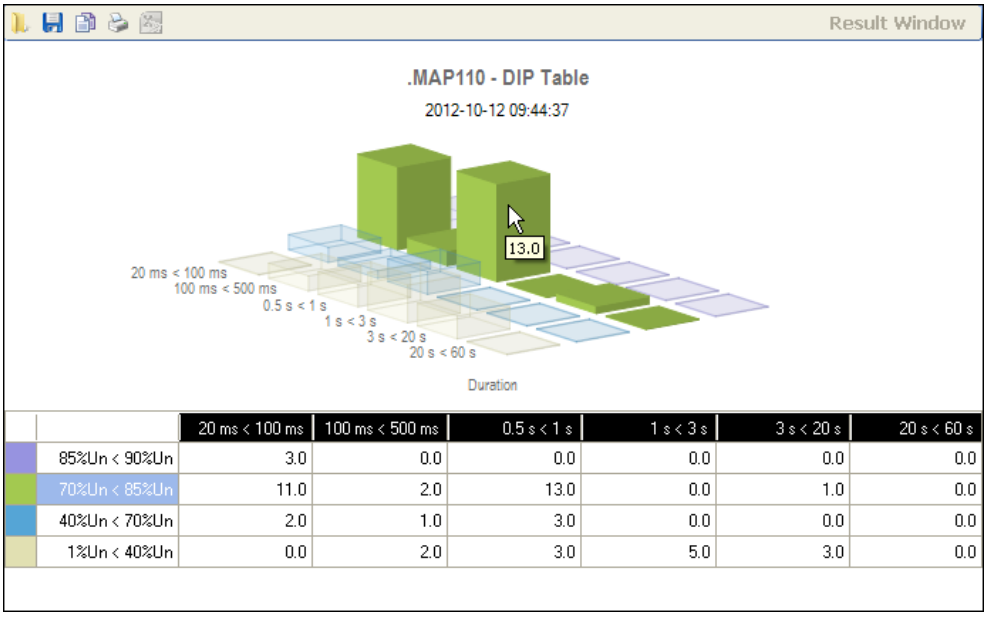
If a change has occurred since the last readout, the relevant bar is shown in red.

When a column or line heading or cell in the table is clicked, the corresponding bar series in the x or y axis or the relevant individual bar is shown highlighted.



		20 ms < 100 ms	100 ms < 500 ms	0.5 s < 1 s	1 s < 3 s	3 s < 20 s	20 s < 60 s
	85%Un < 90%Un	3.0	0.0	0.0	0.0	0.0	0.0
	70%Un < 85%Un	11.0	2.0	13.0	0.0	1.0	0.0
	40%Un < 70%Un	2.0	1.0	3.0	0.0	0.0	0.0
	1%Un < 40%Un	0.0	2.0	3.0	5.0	3.0	0.0

When the cursor is placed on a bar in the diagram, the corresponding value is indicated in the diagram.



		20 ms < 100 ms	100 ms < 500 ms	0.5 s < 1 s	1 s < 3 s	3 s < 20 s	20 s < 60 s
	85%Un < 90%Un	3.0	0.0	0.0	0.0	0.0	0.0
	70%Un < 85%Un	11.0	2.0	13.0	0.0	1.0	0.0
	40%Un < 70%Un	2.0	1.0	3.0	0.0	0.0	0.0
	1%Un < 40%Un	0.0	2.0	3.0	5.0	3.0	0.0

Clicking on  in the result window toolbar opens the "Open Result File" dialogue window to display result files previously saved again in the result window.

Clicking on  in the result window toolbar opens the "Save as" dialogue window to save the data displayed in a freely selected directory as XML file.

Clicking on  in the result window toolbar displays a printing preview, from which the contents of the result window can be printed with the standard printer specified.

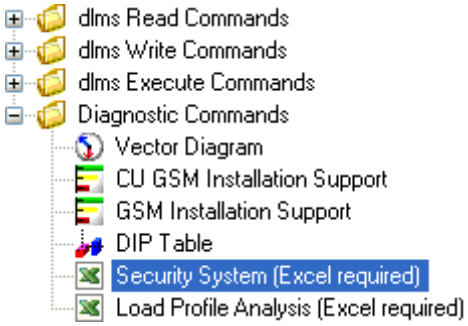
Clicking on  in the result window toolbar copies the content of the result window to the Windows clipboard, from where it can be inserted in another application (e.g. in a word processing program).

Deletion of the DIP table can be performed with the "Reset DIP Table" diagnostic command.

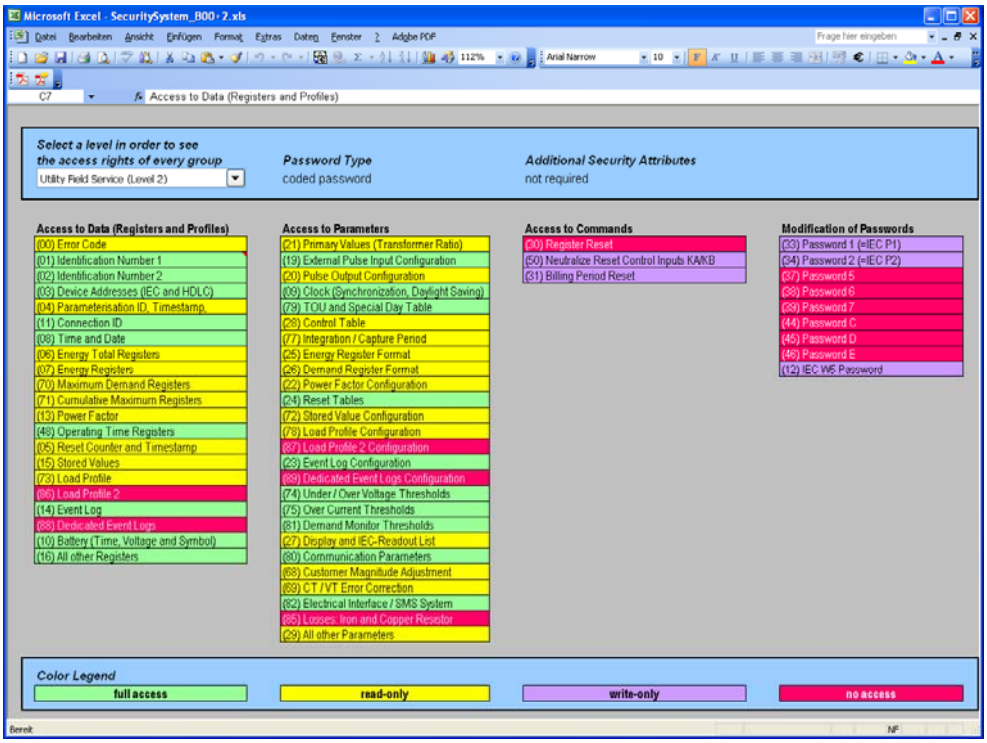
7.4.4 Security System

With this diagnostic command the device security system data can be displayed with the Excel table calculation program.

For execution, select the "Security System" diagnostic command in the command tree.



The security system data is read from the device connected and displayed as follows in the Excel table calculation program:

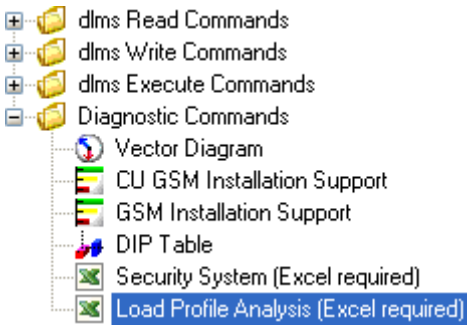


The desired security level can be selected in the selection box at top left. The access rights for the level selected for individual data, parameters, commands and passwords are then displayed by means of colours according to the colour code.

7.4.5 Load Profile Analysis

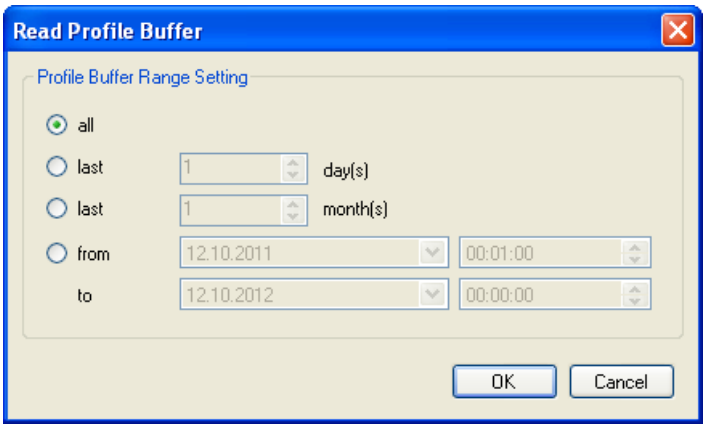
With this diagnostic command an evaluation of the device load profile can be displayed with the Excel table calculation program.

For execution, select the "Load Profile Analysis" diagnostic command in the command tree.



The profile range to be read out can be specified in a dialogue window:

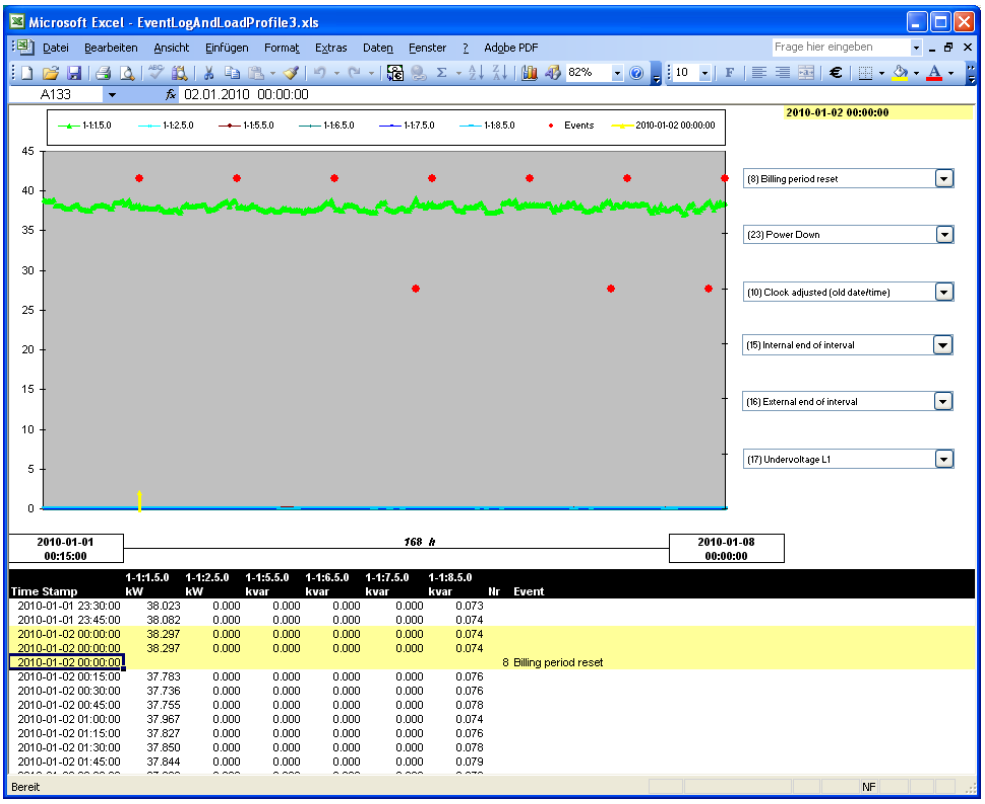
- all (default)
- last x days (with x entered)
- last x months (with x entered)
- from a specific starting date to a specific final date



Shortening readout time by data selection
It is highly recommended to perform a data selection before readout, since readout of the entire event log can take a considerable time (above all if the device has a short integrating period).

The load profile data is read from the device connected.

The load profile data read out is shown as follows with the Excel table calculation program:



The various mean demand values per integrating period are displayed in a diagram in the upper section by means of colours according to the colour code.

The events to be shown can be selected in the selection boxes on the right. If a corresponding event has occurred in the period under review, it is shown in the diagram with a red dot at the level of the selection box.

The individual load profile values and events can be seen in the table below the diagram. Navigation is possible in the table with the arrow keys or the wheel of a roller mouse. A yellow arrow at the lower edge of the diagram indicates on which data in the table the cursor is currently placed.

7.5 Auxiliary Functions

This section describes some auxiliary functions of the Landis+Gyr .MAP110 Service Tool:

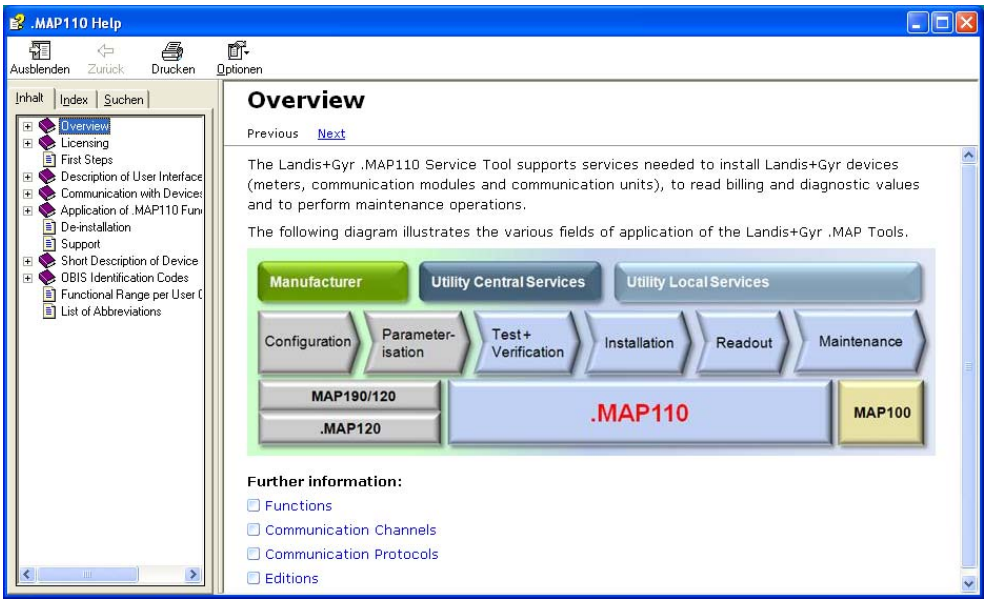
- displaying help topics
- changing the language of the user interface
- displaying the current version of the program
- setting the colour for disabled commands
- setting delay times
- activating command confirmation
- selecting the calendar base
- defining file locations
- enabling MAP100 file export
- displaying read-me file
- checking for updates

7.5.1 Displaying Help Topics

This function permits access to the help texts for the Landis+Gyr .MAP110 Service Tool. These help texts correspond to the contents of this user manual.

Procedure:

1. Press function key [F1] or select **Help** from the **Help** menu.
   The online help for the Landis+Gyr .MAP110 Service Tool appears.



2. Find the desired information.
   Since the help function is a standard Windows function, it will not be explained at this point. More details are found in the Windows manual belonging to your PC.

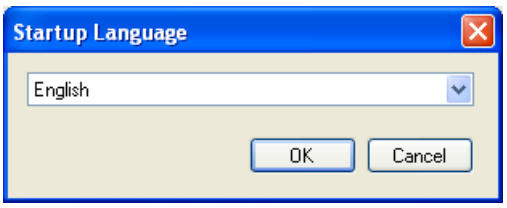
3. Click on ✕ to close the online help.

7.5.2 Changing the Language of the User Interface

This function allows changing the language of the .MAP110 Service Tool user interface.

Procedure:

1. Select **Startup language** from the **Tools** menu.
   The "Startup Language" window appears.



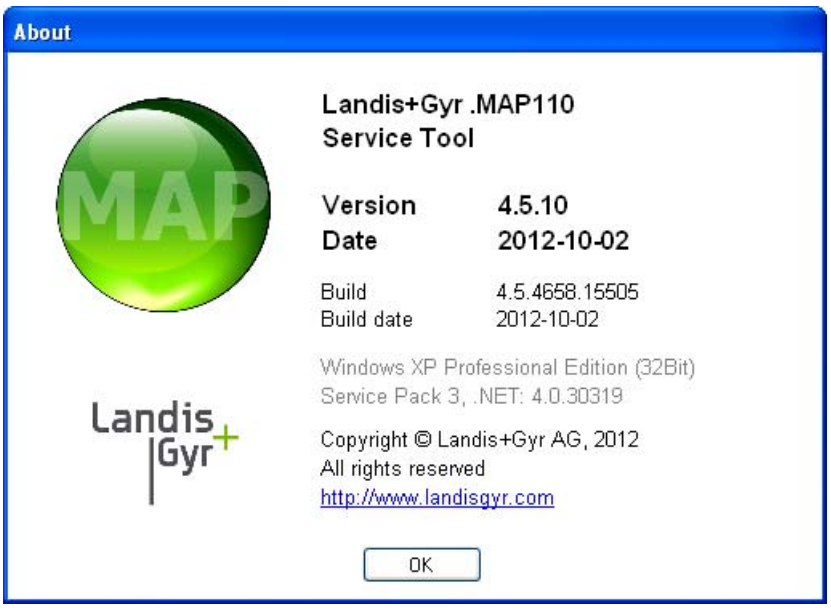
2. Select the desired language.
3. Click on **OK**.
   The "Startup Language" window disappears.
   The selected language will be used upon the next startup of the .MAP110 Service Tool.

7.5.3 Displaying the Current Version of the Program

This function permits the display of information on the current program version.

Procedure:

1. Select **About .MAP110** from the **Help** menu.
   The "About" window appears. It contains information about the current version of the program.



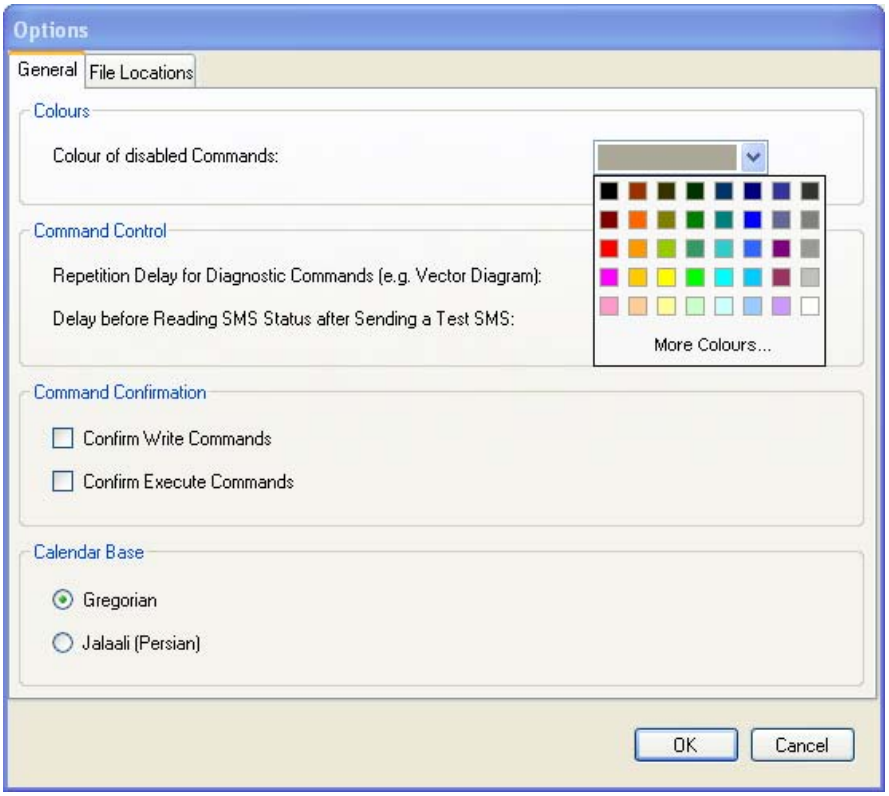
2. Click on **OK**.
   The "About" window disappears.

7.5.4 Setting Colour for Disabled Commands

The colour for emphasising disabled commands can be set individually with this setting (see also 5.4 "Command Tree").

Procedure:

1. Select **Options** from the **Tools** menu.
   The "Options" window appears.
2. Select the "General" tab.
   The colour currently selected for disabled commands is shown.
3. Click on the "Colour of disabled Commands" selection box.
   A colour pallet is displayed.



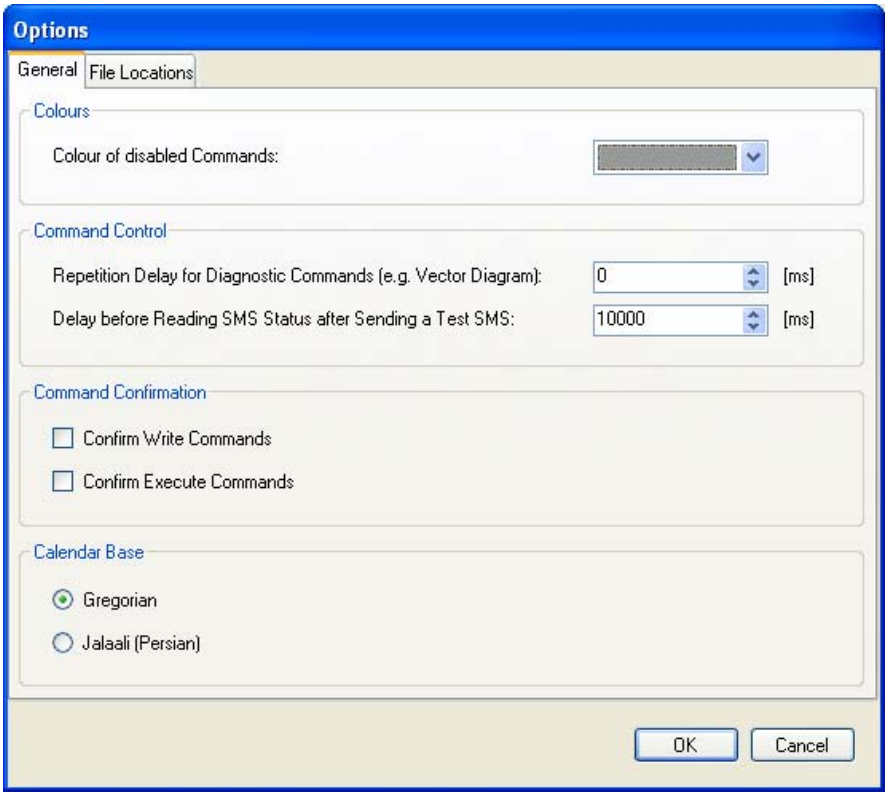
4. Select the desired colour.
   The newly selected colour is displayed in the "Colour of disabled Commands" selection box.
5. Click on **OK**.
   The "Options" window disappears and the disabled commands are emphasised in the new colour in the command tree.

7.5.5 Setting Delay Times

The repetition delay for diagnostic commands and the repetition delay before reading the status of sent test SMS messages can be set individually with this setting.

Procedure:

1. Select **Options** from the **Tools** menu.
   The "Options" window appears.
2. Select the "General" tab.
3. Enter the desired delay times in the corresponding entry fields in the "Command Control" area.

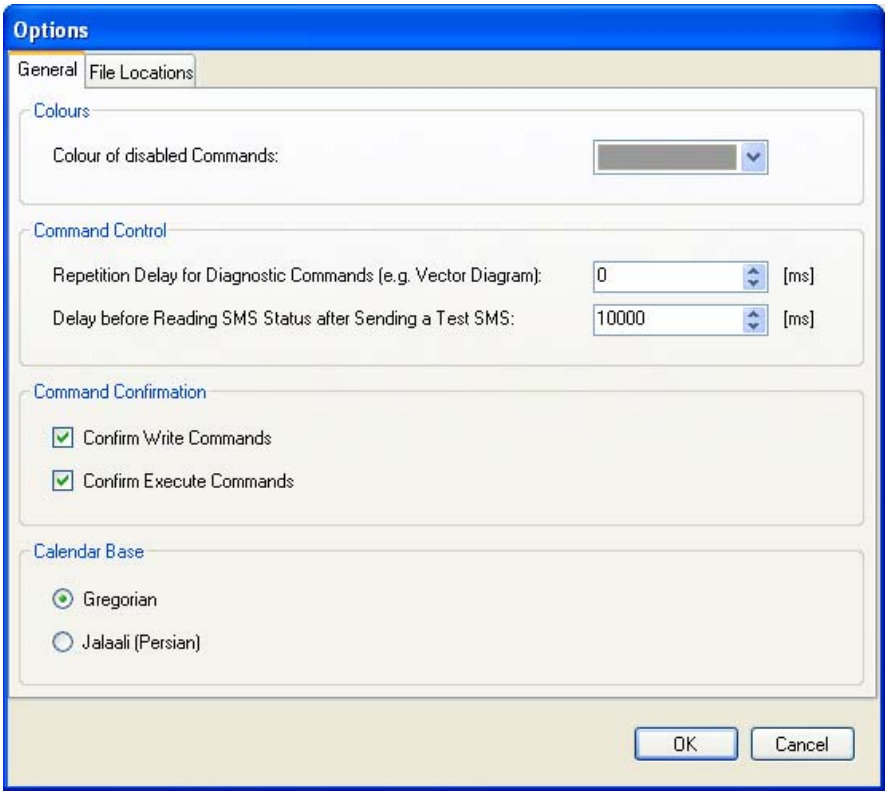


4. Click on **OK**.
   The "Options" window disappears and the new settings are saved.

7.5.6 Activating Command Confirmation

Procedure:

1. Select **Options** from the **Tools** menu.
   The "Options" window appears.
2. Select the "General" tab.
3. Set a tick in the checkboxes of the "Command Confirmation" area for the command(s) which shall be confirmed prior to execution.

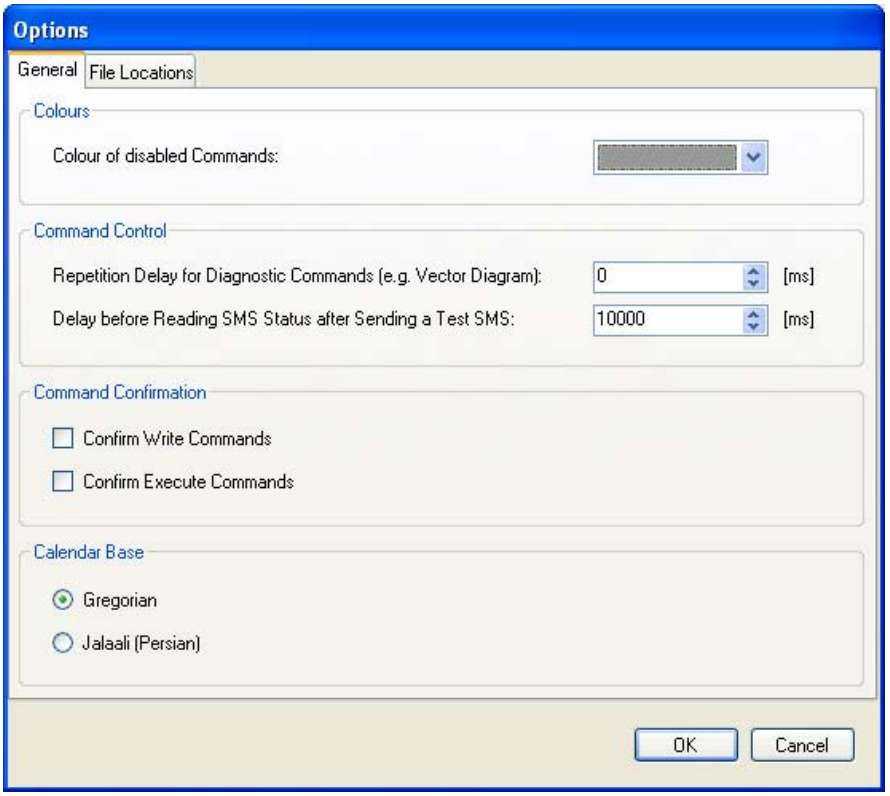


4. Click on **OK**.
   The "Options" window disappears and the new settings are saved.

7.5.7 Selecting the Calendar Base

Procedure:

1. Select **Options** from the **Tools** menu.
   The "Options" window appears.
2. Select the "General" tab.
3. Select the required calendar base in the "Calendar Base" area.



4. Click on **OK**.
   The "Options" window disappears and the new settings are saved.

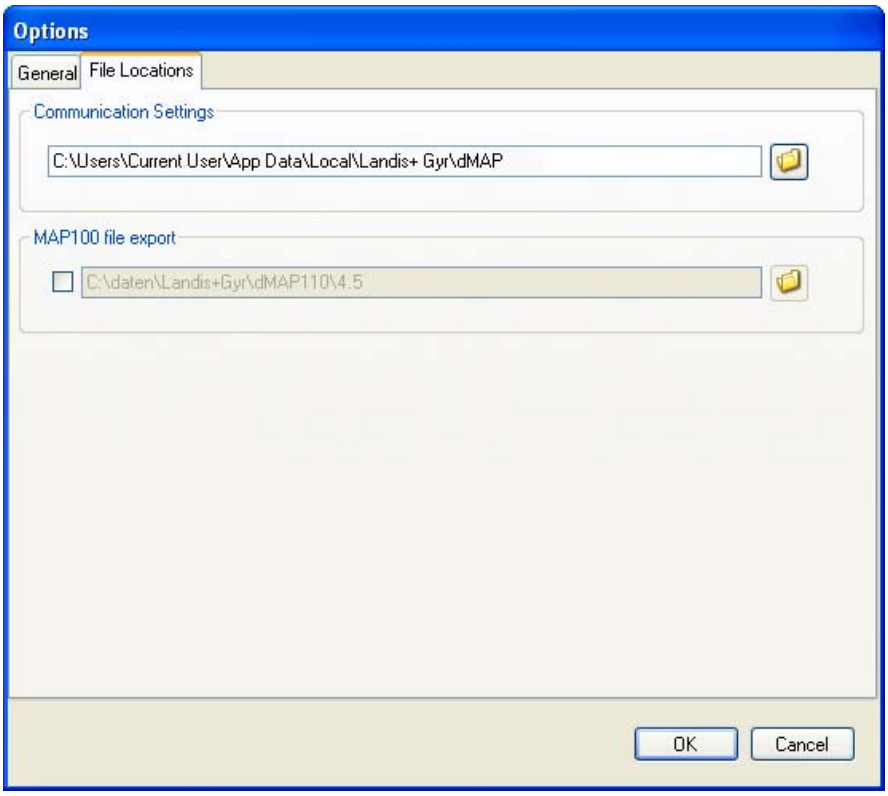
7.5.8 Defining File Locations

The path where communication settings are saved, can be set with this setting.

Defining a directory also accessible by other users of a PC allows the sharing of communication settings with these users. The communication settings can also be used with other .MAP tools.

Procedure:

1. Select **Options** from the **Tools** menu.
   The "Options" window appears.
2. Select the "File Locations" tab.
3. In the "Communication Settings" area click on  and select a directory in the tree appearing or enter the path to the desired directory.



4. Click on **OK**.
   The "Options" window disappears and the new settings are saved.

All communication settings are stored in the files "DeviceConnectionSettings V8.xml" and "AddressBookV8.xml". Please note that these files will not be automatically transferred into the new directory. If required, the files have to be copied or moved manually.

The default directory for an initial installation under Windows 7 is "C:\Users\Current User\AppData\Local\Landis+Gyr\dMAP" or under Windows XP is "C:\Documents and Settings\Current User\Application Data\Landis+Gyr\dMAP", respectively.

The communication settings are used by all .MAP applications of a user. Other users of a shared PC can also use the same communication settings, provided that a directory for file locations has been defined, to which all users have access (the above mentioned default directory is user specific).

7.5.9 Enabling MAP100 File Export

MAP100 export files (scripts) for mass parameterisation of devices with the MAP100 Upload Tool can be generated and stored in a designated directory during execution of the following write commands (marked with in the command tree):

- Parameterisation ID
- Passwords level 1, 2 and E
- Time of use (TOU)
- Billing period reset

Only MAP100 V2.0 supported
Note that only MAP100 V2.0 is supported, i.e. the export data is in the MAP100 V2.0 format.

The export file names have the following format: vvv_name_date_time.rep

where
vvv = Firmware version of the device
name = Designation of the write command
date = Generation date in the format YYYYMMDD (year, month, day)
time = Generation time in the format hhmmss (hour, minute, second)
rep = File extension for all MAP100 files (repair)

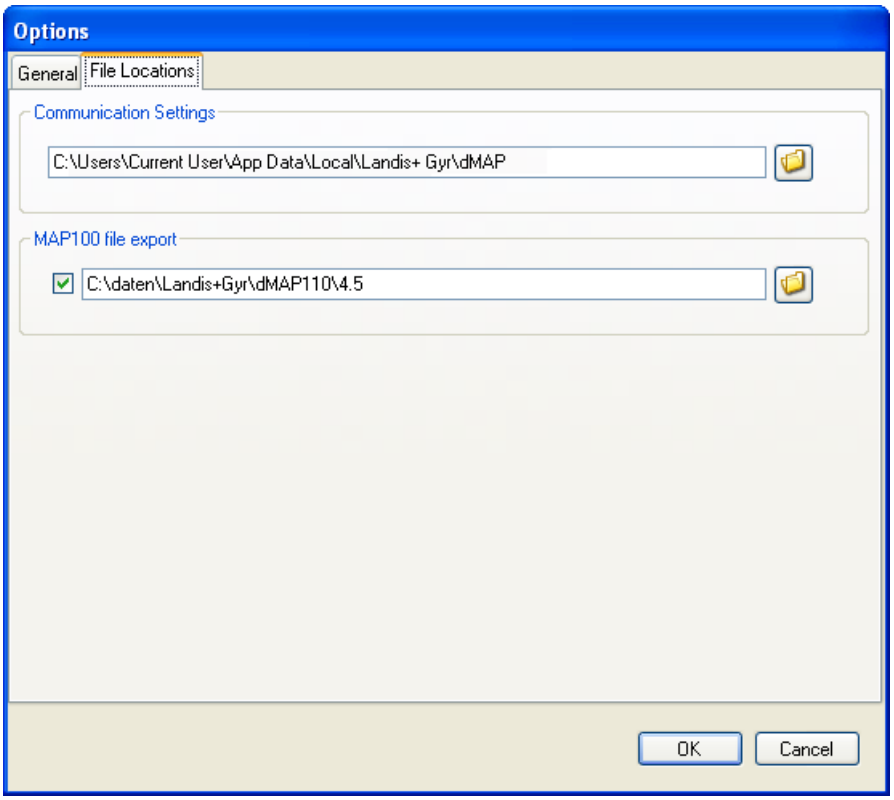
Example of the file name for a TOU exported into a ZMD405CT with firmware version B30 on 26th February 2010 at 16:45 hours:
B30_TimeOfUseDS_20100226_164500.rep

The generation of MAP100 files can be activated and the definition, where these files are saved, can be set with the following procedure.

To avoid unintentional creation of files, please make sure to disable the feature again after successful creation of the needed data files.

Procedure:

1. Select **Options** from the **Tools** menu.
   The "Options" window appears.
2. Select the "File Locations" tab.
3. Tick the checkbox "MAP100 file export" to activate or remove the tick to deactivate the function.
4. In the "MAP100 file export" area click on  and select a directory in the tree appearing or enter the path to the desired directory.



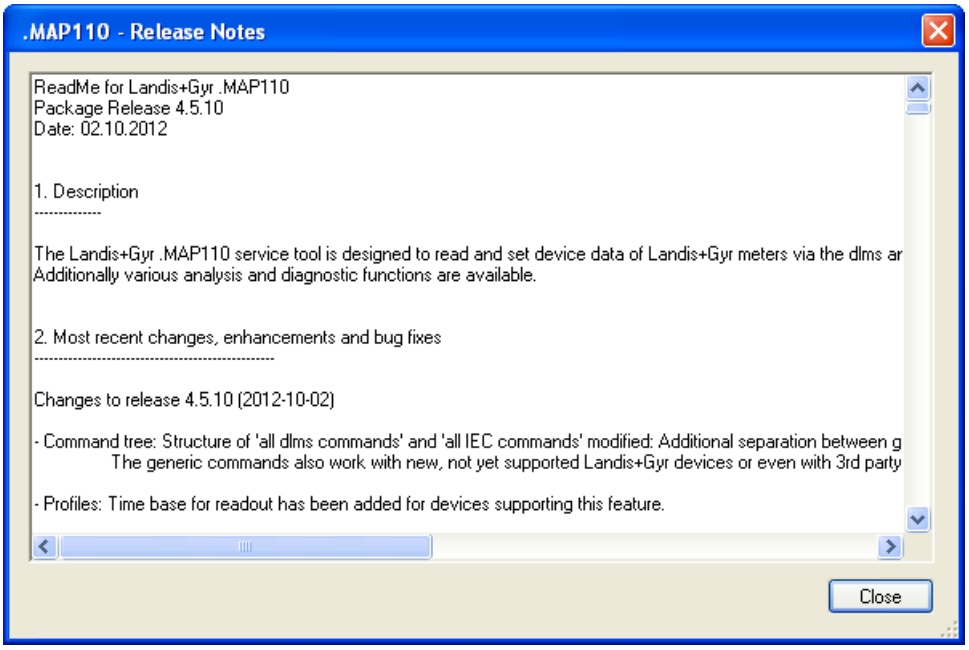
5. Click on **OK**.
   The "Options" window disappears and the new settings are saved.

7.5.10 Displaying Read-me File

This function displays the latest read-me file.

Procedure:

1. Select **Release Notes** from the **Help** menu.
   The latest read-me file appears.



2. Obtain the information you are interested in.
3. Click on **Close** to close the read-me file again.

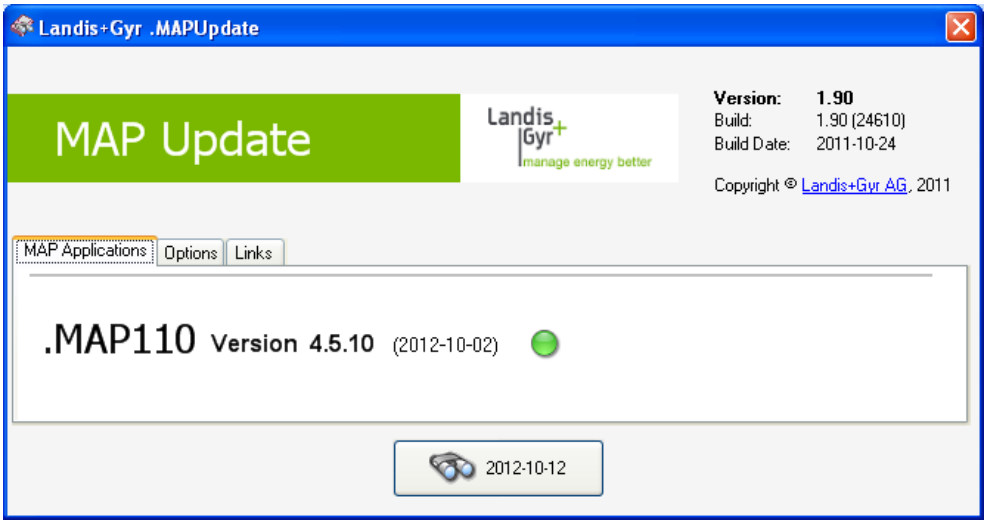
7.5.11 Checking for Updates

This function permits checking whether the installed .MAP110 version is up to date.

Internet access required
To perform a check for updates the PC must have access to the Internet, since the .MAP Home Page must be contacted for this.

Procedure:

1. Select **Check for updates** from the **Help** menu.
   The "Landis+Gyr .MAPUpdate" window appears.



   An automatic query is performed on the MAP Home Page to determine the latest released version available.

   The  icon is displayed, if the installed version is up to date. If this is not the case, click on the link Landis+Gyr AG to access the MAP Software Download area and download and install the latest version of the .MAP110 software.

2. Close the "Landis+Gyr .MAPUpdate" window.

8 De-installation

This section describes how to de-install the Landis+Gyr .MAP110 Service Tool from the hard disk of your PC.

If the Landis+Gyr .MAP110 Service Tool is no longer needed, it should be de-installed. To do so, use the de-installation program delivered and installed together with the .MAP110.

Automatic overwriting
If the Landis+Gyr .MAP110 Service Tool version 4.5.x (e.g. 4.5.03) is to be updated with the latest version 4.5.y (e.g. 4.5.10), the latest version will be automatically installed over the older version. In this case, it is not necessary to de-install the former version.

Procedure:

Click on **Start** and then under **Programs** select the **Landis+Gyr .MAP110 Uninstall** command from the menu **Landis+Gyr .MAP110 4.5** in the **Landis+Gyr** program group.
The de-installation program is started. Please follow the instructions on the screen.

9 Support

The following is designed to help you take the right measure to tackle any problems you may experience when using the Landis+Gyr .MAP110 Service Tools.

If a problem arises try to solve it yourself first by applying the following measures:

- Consult the appropriate section of this manual.
- Invoke the help function as described in section 7.5.1 "Displaying Help Topics".
- Read the content of the Readme.txt file, supplied with the software.

If these measures do not help, contact your local Landis+Gyr representative.

10 Short Description of Device Security System

10.1 Introduction

The data and parameters of the Landis+Gyr devices are protected against unintended or improper access by a flexible, multi-stage security system. It is very similar to the one used in computer systems and consists of several access levels (users) with different access rights.

Detailed information on the security system for the relevant devices is provided in the associated functional descriptions.

10.2 Security Attributes

For each access level, various security attributes can be defined that must be fulfilled to gain access.

Switches protected by the verification seal

Protected by the verification seal, there is for many devices (e.g. under the main face plate) a block of security switches or jumpers. Their position must be defined in order to gain access to a particular level.

Entering the service menu

It may be defined that access to a certain level will only be granted from the service menu. To enter the service menu, the utility seal must be removed.

Passwords/Keys

A password may be defined for some access levels. Either a static 8-character password, a coded 7-character password or a 32-character encryption key can be used.

If a static password is used, the user only needs to know the password. It is checked by the device and access is granted if the passwords match.

If a coded password or an encryption key is used, the user not only needs to know the password but also an encryption algorithm. Due to the encryption, a Landis+Gyr tool is required to access such a level.

Only the characters '0' to '9' and 'A' to 'F' are allowed for passwords and keys.

Communication channels

The access to a certain level may be restricted so that it is only granted via selected communication channels. Access is for instance possible via the optical interface, the integrated interface and both communication channels of the communication unit.

10.3 Access Levels

The Landis+Gyr devices feature up to 15 different access levels (level 0 to 9 and A to E) with different access rights each. For groups of registers and parameters, it can be defined which level is required to read and which level is required to write.

Each access level is protected by security attributes which must be fulfilled to gain access. In order to simplify the handling and to ensure compatibility to other device series, most of the security attributes have been partially or completely fixed.

All access levels are technically strictly independent i.e. a higher access level does not automatically bear all rights of the lower access levels.

10.4 Access Levels and their Application

The table below describes all access levels with their security attributes and their typical application. The access rights are defined by the utility when ordering the device. They depend on the needs of the utility and on the national regulations.

For levels 0 to 4 access is possible via the dlms and the IEC protocol, for levels 5 to G via the dlms protocol only. The UID (user identification) is used in dlms communication to select the access level.

Please note that not all access levels are available in all devices, the table below therefore just gives an overview. Please always refer to the functional description of the currently used device.

Level	Security attributes	Access rights and typical application examples
0 Public Access UID = 16	without password without breaking a seal all interfaces	This access level is always available. All dlms devices can be accessed on this level. All data can be read but there is no write access.
1 Data Collection UID = 32	with static password without breaking a seal interfaces selectable	Readout of billing data by means of a handheld terminal or possibly by a central system. All billing data is readable. Limited write access possible, e.g. time/date.
2 Utility Field Service UID = 48	with coded password or encryption key without breaking a seal interfaces selectable Landis+Gyr Tool required because of coded password or encryption algorithm	Maintenance tasks. All parameters and all billing data are readable. Limited write access to uncritical data is possible, e.g. device addresses, identification numbers, phone numbers etc.
3 Utility Service UID = 64	without password breaking the utility seal necessary local interfaces only	Installation or maintenance work in the utility and in the field. All parameters and all billing data are readable. Limited write access to settable data is possible, e.g. battery operating time, switching tables etc.
4 Extended Utility Service UID = 80	without password breaking the verification seal necessary local interfaces only	Installation or maintenance work in the utility. Verification is usually required afterwards. All parameters and all billing data are readable. Write access to all data is possible, e.g. parameterisation, register clearing, password setting etc.
5 Extended Consumer UID = 17	with static password without breaking a seal interfaces selectable	Write access for the end user. All parameters and most billing data are readable. Limited write access to the end user data is possible, e.g. monitor thresholds.
6 Remote Data Collection UID = 18	with static password without breaking a seal remote interfaces only	Remote readout of billing data by a central system. All billing data is readable. Limited write access is possible, e.g. time/date.
7 Remote Service UID = 19	with static or coded password without breaking a seal remote interfaces only	Installation or maintenance work in connection with a central system. All parameters and all billing data are readable. Limited write access to settable data is possible, e.g. switching tables, device addresses, identification numbers, phone numbers etc.

Level	Security attributes	Access rights and typical application examples
G Management UID = 1	with static password without breaking a seal all interfaces	Installation or maintenance work after verification (locally or via a central system). All parameters and all billing data are readable. Limited write access to settable data is possible, e.g. switching tables, device addresses, identification numbers, phone numbers etc.
8, 9		Reserved for future expansion.
A Utility Defined UID = 22	attributes selectable at ordering time	No typical application defined. Access rights defined at ordering time according to the needs of the utility.
B		Reserved for future expansion.
C Read Administrator UID = 96	with static password without breaking a seal	Allocation of read access rights All parameter and all billing data are readable. Read access rights for all lower levels (0 to B) can be allocated.
D Utility Administrator UID = 97	with coded password breaking the verification seal necessary local interfaces only Landis+Gyr Tool required because of coded password	Same as level 4. In addition, changes in the utility security system are possible: Read and write access rights can be adapted and all passwords can be changed.
E Distributor Service UID = 100	with coded password breaking the verification seal necessary local interfaces only Landis+Gyr Tool required because of coded password	Service access of the distributor. Identical to level D. In addition, changing the access rights and the password of the utility administrator is possible.

11 OBIS Identification Codes

11.1 General Description

For OBIS (Object Identification System) the structure **A-B:C.D.E.F** applies, whereby the individual groups have the following significance:

A Defines the characteristic of the data item to be identified, e.g. abstract data, electricity-, gas-, heat- or water-related data.

B Defines the channel number, i.e. the number of the input of a metering equipment having several inputs for the measurement of energy of the same or different types (e.g. in data concentrators, registration units). This enables data from different sources to be identified.

C Defines the abstract or physical data items related to the information source concerned, e.g. active power, reactive power, apparent power, power factor, current or voltage.

D Defines types, or the result of the processing of physical quantities according to various specific algorithms. The algorithms can deliver energy and demand quantities as well as other physical quantities.

E Defines the further processing of measurement results to tariff registers, according to the tariffs in use. For abstract data or for measurement results for which tariffs are not relevant, this value group can be used for further classification.

F Defines the storage of data according to different billing periods. Where this is not relevant, this value group can be used for further classification.

To simplify the reading in the index field, individual groups of the OBIS code can be omitted. The abstract or physical data C and type of data D must be shown. **A full specification of the OBIS identification number system can be found in standard IEC 62056-61.**

Only the values of interest to metering devices are explained below with a collection of examples.

Group A

Group A of the OBIS identification can theoretically have values in the range between 0 and 9. Only the values
0 (abstract objects) and
1 (electricity related objects)
appear in the Landis+Gyr .MAP110 Service Tool.

Group B

Group B of the OBIS identification can theoretically have values in the range between 0 and 64. Only the values
0 (no channel specified)
1 (channel 1) and
2 (channel 2)
appear in the Landis+Gyr .MAP110 Service Tool.

Group C

Group C of the OBIS identification can have values in the range between 0 and 255. The individual values are differently assigned depending on the value of group A. The values for abstract items (group A = 0) are of no interest at this point, since they are largely specific to either context, country or manufacturer.

The following table shows the values of group C of the OBIS identification for electricity related objects. It has the form of a matrix and is read as follows: the value **46** for instance stands for reactive energy in the second quadrant for phase L2.

General purpose objects			**0**					
Active energy	import (+A)	∑ Li	**1**	L1	**21**	L2	**41**	L3	**61**
	export (-A)	∑ Li	**2**	L1	**22**	L2	**42**	L3	**62**
Reactive energy	import (+R)	∑ Li	**3**	L1	**23**	L2	**43**	L3	**63**
	export (-R)	∑ Li	**4**	L1	**24**	L2	**44**	L3	**64**
	Quadrant I (+Ri)	∑ Li	**5**	L1	**25**	L2	**45**	L3	**65**
	Quadrant II (-Rc)	∑ Li	**6**	L1	**26**	L2	**46**	L3	**66**
	Quadrant III (-Ri)	∑ Li	**7**	L1	**27**	L2	**47**	L3	**67**
	Quadrant IV (+Rc)	∑ Li	**8**	L1	**28**	L2	**48**	L3	**68**
Apparent energy	import (+VA)	∑ Li	**9**	L1	**29**	L2	**49**	L3	**69**
	export (-VA)	∑ Li	**10**	L1	**30**	L2	**50**	L3	**70**
Current		∑ Li	**11**	L1	**31**	L2	**51**	L3	**71**
Voltage		∑ Li	**12**	L1	**32**	L2	**52**	L3	**72**
Power factor		∑ Li	**13**	L1	**33**	L2	**53**	L3	**73**
Frequency			**14**	L1	**34**	L2	**54**	L3	**74**
Active energy quadrant I+IV+II+III				L1	**35**	L2	**55**	L3	**75**
Active energy quadrant I+IV-II-III				L1	**36**	L2	**56**	L3	**76**
Quadrant I				L1	**37**	L2	**57**	L3	**77**
Quadrant II				L1	**38**	L2	**58**	L3	**78**
Quadrant III				L1	**39**	L2	**59**	L3	**79**
Quadrant IV				L1	**40**	L2	**60**	L3	**80**
Phase angles			**81**						
Neutral current			**91**						
Neutral voltage			**92**						
Service information*			**96**						
Error message*			**97**						
Log data*			**98**						
Profile data*			**99**						

* In all data readouts the OBIS code is shown in .MAP110 in numeric format only (as defined in the standard) instead of partly using characters. Affected values: "C"=96, "F"=97, "L"=98 and "P"=99. This now allows a correct referencing to the standard.

The values 128 to 255 have Manufacturer-specific definitions.
Some examples of Landis+Gyr definitions are:

Value	**Application**
130	Sum of all phases: reactive energy quadrant I+IV+II+III
131	Sum of all phases: reactive energy quadrant I+II-III-IV

Value	Application
132	Sum of all phases: reactive energy quadrant I+IV
133	Sum of all phases: reactive energy quadrant II+III
150	Phase 1: reactive energy quadrant I+IV+II+III
151	Phase 1: reactive energy quadrant I+II-III-IV
152	Phase 1: reactive energy quadrant I+IV
153	Phase 1: reactive energy quadrant II+III
170	Phase 2: reactive energy quadrant I+IV+II+III
171	Phase 2: reactive energy quadrant I+II-III-IV
172	Phase 2: reactive energy quadrant I+IV
173	Phase 2: reactive energy quadrant II+III
190	Phase 3: reactive energy quadrant I+IV+II+III
191	Phase 3: reactive energy quadrant I+II-III-IV
192	Phase 3: reactive energy quadrant I+IV
193	Phase 3: reactive energy quadrant II+III

Group D

Group D of the OBIS identification can have values in the range between 0 and 255. The individual values are differently assigned depending on the value of group A and C, but are not described here.

Group E

Group E of the OBIS identification can have values in the range between 0 and 255. In the Landis+Gyr .MAP110 Service Tool for group E for electricity-related items (group A = 1) the values corresponding to the number of tariffs specified mainly appear (0 = total of all tariffs, 1 = tariff 1, 2 = tariff 2, etc.). Other values apply for specific values of group C, but these are not described here.

Group F

Group F of the OBIS identification can have values in the range between 0 and 255. In the Landis+Gyr .MAP110 Service Tool group F is not used and is therefore always set to 255.

11.2 Examples

The following table shows a selection of OBIS identification numbers and explains their significance.

OBIS code (decimal)	OBIS code (hex)	Description
	A B C D E F	
0-0:1.0.0	00 00 01 00 00 FF	Clock
0-0:42.0.0	00 00 2A 00 00 FF	dlms device identification
0-0:96.1.0	00 00 60 01 00 FF	Identification number 2.1
0-0:96.1.1	00 00 60 01 01 FF	Identification number 2.2
0-0:96.2.0	00 00 60 02 00 FF	Number of parameterisations
0-0:96.2.1	00 00 60 02 01 FF	Date and time of last parameterisation
0-0:96.2.2	00 00 60 02 02 FF	Activation date TOU
0-0:96.2.3	00 00 60 02 03 FF	Date of last RCR program change

OBIS code (decimal)	OBIS code (hex)	Description
	A B C D E F	
0-0:96.240.0	00 00 60 F0 00 FF	EEPROM identification
0-0:96.240.13	00 00 60 F0 0D FF	Hardware ID
0-0:96.3.1	00 00 60 03 01 FF	Input terminal states base meter
0-0:96.3.2	00 00 60 03 02 FF	Output terminal states base meter
0-0:96.4.0	00 00 60 04 00 FF	Internal control signal states
0-0:96.5.0	00 00 60 05 00 FF	Internal operating state
0-0:96.6.0	00 00 60 06 00 FF	Operating time of battery
0-0:96.6.3	00 00 60 06 03 FF	Battery voltage
0-0:96.7.0	00 00 60 07 00 FF	Number of phase fails L1..L3
0-0:96.7.1	00 00 60 07 01 FF	Number of phase fails L1
0-0:96.7.2	00 00 60 07 02 FF	Number of phase fails L2
0-0:96.7.3	00 00 60 07 03 FF	Number of phase fails L3
0-0:96.8.0	00 00 60 08 00 FF	Total operating time
0-0:96.8.t	00 00 60 08 t FF	Operating time (t = tariff number)
0-0:96.90	00 00 60 5A FF FF	Configuration ID
0-0:96.90.1	00 00 60 5A 01 FF	Physical IEC device address
0-0:96.90.2	00 00 60 5A 02 FF	Physical HDLC device address
1-0:96.2.7	00 00 60 02 07 FF	Activation date passive TOU
0-0:97.97.0	00 00 61 61 00 FF	Error code register
0-0:98.1.0*126	00 00 62 01 00 7E	Stored values
0-0:240.1.0	00 00 F0 01 00 FF	Device functions
0-1:96.2.5	00 01 60 02 05 FF	Date and time of last calibration
0-1:96.240.8	00 01 60 F0 08 FF	Hardware ID of base meter
0-1:96.3.1	00 01 60 03 01 FF	Input terminal states extension board
0-1:96.3.2	00 01 60 03 02 FF	Output terminal states extension board
0-2:96.240.8	00 02 60 F0 08 FF	Hardware ID of extension board
0-2:96.240.9	00 02 60 F0 09 FF	Reference hardware ID of extension board
1-0:0.0.1	01 00 00 00 00 FF	Identification number 1.1
1-0:0.0.2	01 00 00 00 01 FF	Identification number 1.2
1-0:0.0.3	01 00 00 00 02 FF	Identification number 1.3
1-0:0.0.4	01 00 00 00 03 FF	Identification number 1.4
1-0:0.1.0	01 00 00 01 00 FF	Reset counter
1-0:0.1.2	01 00 00 01 02 FF	Time and date of last billing period reset
1-0:0.2.0	01 00 00 02 00 FF	Software ID
1-0:0.2.1	01 00 00 02 01 FF	Parameterisation ID
1-0:0.2.3	01 00 00 02 03 FF	Ripple control receiver ID

OBIS code (decimal)	OBIS code (hex)						Description
	A	B	C	D	E	F	
1-0:0.2.4	01	00	00	02	04	FF	Connection ID
1-0:0.2.7	01	00	00	02	07	FF	Passive TOU ID
1-0:0.9.5	01	00	00	09	05	FF	Weekday
1-0:96.99.8	01	00	60	69	08	FF	Display and IEC readout ID
1-0:99.1.0	01	00	63	01	00	FF	Load profile
1-0:99.98.0	01	00	63	62	00	FF	Event log
1-1:0.3.0	01	01	00	03	00	FF	Meter constant active energy
1-1:0.3.1	01	01	00	03	01	FF	Meter constant reactive energy
1-1:0.4.0	01	01	00	04	00	FF	Scale factor for demand display
1-1:0.4.1	01	01	00	04	01	FF	Scale factor for energy display
1-1:0.4.2	01	01	00	04	02	FF	Current transformer ratio
1-1:0.4.3	01	01	00	04	03	FF	Voltage transformer ratio
1-1:13.0.0	01	01	0D	00	00	FF	Average billing period power factor
1-1:13.3.n	01	01	0D	03	n	FF	Power factor minimum (n = number)
1-1:13.31.n	01	01	0D	23	n	FF	Power factor threshold (n = number)
1-1:13.35.n	01	01	0D	23	n	FF	Power factor monitor threshold (n = number)
1-1:13.5.0	01	01	0D	00	00	FF	Last average power factor
1-1:13.7.0	01	01	0D	07	00	FF	Total power factor
1-1:14.7.0	01	01	0E	07	00	FF	Mains frequency
1-1:16.7.0	01	01	10	07	00	FF	Active energy
1-1:31.7.0	01	01	1F	07	00	FF	Current L1
1-1:31.35.0	01	01	1F	23	00	FF	Overcurrent threshold L1
1-1:32.7.0	01	01	20	07	00	FF	Voltage L1
1-1:32.31.0	01	01	20	1F	00	FF	Undervoltage threshold L1
1-1:32.35.0	01	01	20	23	00	FF	Overvoltage threshold L1
1-1:33.7.0	01	01	21	07	00	FF	Power factor L1
1-1:51.7.0	01	01	33	07	00	FF	Current L2
1-1:51.35.0	01	01	33	23	00	FF	Overcurrent threshold L2
1-1:52.7.0	01	01	34	07	00	FF	Voltage L2
1-1:52.31.0	01	01	34	1F	00	FF	Undervoltage threshold L2
1-1:52.35.0	01	01	34	23	00	FF	Overvoltage threshold L2
1-1:53.7.0	01	01	35	07	00	FF	Power Factor L2
1-1:71.7.0	01	01	47	07	00	FF	Current L3
1-1:71.35.0	01	01	47	23	00	FF	Overcurrent threshold L3
1-1:72.7.0	01	01	48	07	00	FF	Voltage L3
1-1:72.31.0	01	01	48	1F	00	FF	Undervoltage threshold L3
1-1:72.35.0	01	01	48	23	00	FF	Overvoltage threshold L3
1-1:73.7.0	01	01	49	07	00	FF	Power Factor L3

OBIS code (decimal)	OBIS code (hex)						Description
	A	B	C	D	E	F	
1-1:81.7.0	01	01	51	07	00	FF	Angle U(L1) to U(L1)
1-1:81.7.1	01	01	51	07	01	FF	Angle U(L2) to U(L1)
1-1:81.7.2	01	01	51	07	02	FF	Angle U(L3) to U(L1)
1-1:81.7.3	01	01	51	07	04	FF	Angle I(L1) to U(L1)
1-1:81.7.4	01	01	51	07	05	FF	Angle I(L2) to U(L1)
1-1:81.7.5	01	01	51	07	06	FF	Angle I(L3) to U(L1)
1-1:91.7.0	01	01	5B	07	00	FF	Neutral current
1-1:91.35.0	01	01	5B	23	00	FF	Overcurrent threshold N
1-1:131.7.0	01	01	83	07	00	FF	Reactive energy
1-1:m.2.0	01	01	m	02	00	FF	Cumulative maximum demand (m = measured quantity)
1-1:m.4.0	01	01	m	04	00	FF	Current average demand (m = measured quantity)
1-1:m.6.t	01	01	m	06	t	FF	Maximum demand register (m = measured quantity, t = tariff number)
1-1:m.8.0	01	01	m	08	00	FF	Total energy register (m = measured quantity)
1-1:m.8.t	01	01	m	08	t	FF	Energy register (cumulative) (m = measured quantity, t = tariff number)
1-1:m.9.t	01	01	m	09	t	FF	Energy register (billing period delta value) (m = measured quantity, t = tariff number)
1-1:m.29.t	01	01	m	1D	t	FF	Energy register (registration period delta value) (m = measured quantity, t = tariff number)
1-1:m.35.n	01	01	m	23	n	FF	Demand register monitor threshold (m = measured quantity, n = number)
1-2:82.8.0	01	02	52	08	00	FF	Counter S0 pulses input 1
1-3:82.8.0	01	03	52	08	00	FF	Counter S0 pulses input 2
a-2:m.8.0	a	02	m	08	00	FF	External pulse input 1 (a = medium, m = measured quantity)
a-3:m.8.0	a	03	m	08	00	FF	External pulse input 2 (a = medium, m = measured quantity)

12 Functional Range per User Group

The following tables show the functions which can be performed for the different user groups (note right-hand columns for dlms and IEC).

Read Commands

User Group								
Consumer (final customer)								
Field Inspection								
Reader								
Installation (field use)								
Engineering (laboratory use)								
Certification								
Read Commands							**dlms**	**IEC**
•	•	•	•	•	•	Billing Values (Data Readout)	•	•
•	•	•	•	•	•	Instantaneous Values	•	
		•	•	•	•	Emergency Readout		•
						Clock		
•	•	•	•	•	•	Date and Time	•	•
•	•	•	•	•	•	DST Settings	•	
•	•	•	•	•	•	Clock Synchronisation	•	
•	•	•	•	•	•	Clock Base	•	
•	•	•	•	•	•	0-0:1.0.0 Clock	•	
•	•	•	•	•	•	Date, Time and DST Flag		•
						Profiles		
•	•	•	•	•	•	Integration Period	•	
•	•	•	•	•	•	Capture Periods	•	
•	•	•	•	•	•	Load Profile 1	•	R5
•	•	•	•	•	•	Load Profile 1 Configuration	•	
•	•	•	•	•	•	Load Profile 2	•	
•	•	•	•	•	•	Load Profile 2 Configuration	•	
•	•	•	•	•	•	Stored Values/Billing Data Profile	•	
•	•	•	•	•	•	Energy Profile	•	
•	•	•	•	•	•	Daily Snapshot Profile	•	
						Event Logs		
		•	•	•	•	(Standard) Event Log	•	R5
		•	•	•	•	Disconnector Control Log	•	
•	•	•	•	•	•	Parameter Changes Log	•	
•	•	•	•	•	•	Firmware Update Log	•	
						Communication Monitoring		
•	•	•	•	•	•	M-Bus Event Log	•	
•	•	•	•	•	•	Remote Communication Log	•	
•	•	•	•	•	•	Received Signal Strength Profile	•	
						Demand Monitoring		
•	•	•	•	•	•	Overcurrent Log	•	

User Group								
Consumer (final customer)								
	Field Inspection							
		Reader						
			Installation (field use)					
				Engineering (laboratory use)				
					Certification			
						Read Commands	**dlms**	**IEC**
•	•	•	•	•	•	Current 10 Highest Maximum Demands Log	•	
•	•	•	•	•	•	Last 10 Highest Maximum Demands Log	•	
•	•	•	•	•	•	Before Last 10 Highest Maximum Demands Log	•	
•	•	•	•	•	•	Demand Monitor 1 to 4 Log	•	
						Power Quality Monitoring		
•	•	•	•	•	•	Power Quality Log	•	
•	•	•	•	•	•	Overvoltage Log	•	
•	•	•	•	•	•	Undervoltage Log	•	
•	•	•	•	•	•	Phase Failure Log	•	
•	•	•	•	•	•	Power Failure Log	•	
•	•	•	•	•	•	Current Voltage Quality Losses Log	•	
•	•	•	•	•	•	Last Voltage Quality Losses Log	•	
•	•	•	•	•	•	Before Last Voltage Quality Losses Log	•	
						Fraud Monitoring		
	•	•	•	•	•	Fraud Detection Log	•	
	•	•	•	•	•	Strong DC Field Detection Log	•	
	•	•	•	•	•	Front Cover Removal Log	•	
	•	•	•	•	•	Terminal Cover Removal Log	•	
	•	•	•	•	•	Phase Sequence Reversal Log	•	
	•	•	•	•	•	Negative Active Energy Flow Log	•	
	•	•	•	•	•	Current with Undervoltage Log	•	
	•	•	•	•	•	Open/Shortened CT Log	•	
	•	•	•	•	•	Undercurrent Log	•	
	•	•	•	•	•	Overcurrent in Neutral Log	•	
						Energy Registers		
	•	•	•	•	•	Energy Total Registers	•	
	•	•	•	•	•	Energy Registers	•	
	•	•	•	•	•	Current Hour Registers	•	
						Demand Registers		
	•	•	•	•	•	Last Average Demand Registers	•	
	•	•	•	•	•	Maximum Demand Registers	•	
						Identification Numbers		
•	•	•	•	•	•	COSEM Logical Device Name	•	
•	•	•	•	•	•	Firmware Version	•	

						User Group		
						Consumer (final customer)		
						Field Inspection		
						Reader		
						Installation (field use)		
						Engineering (laboratory use)		
						Certification		
						Read Commands	**dlms**	**IEC**
					•	Extended Firmware Version	•	
					•	Extended Firmware Version CU	•	
	•	•	•	•	•	Identification Numbers 1.1 to 1.4	•	•
	•	•	•	•	•	Device ID 1 to 6 (utility serial number 1 to 6, ID 2.1 to 2.5)	•	
	•	•	•	•	•	Connection ID	•	
	•	•	•	•	•	Parameterisation ID	•	
	•	•	•	•	•	Configuration ID	•	
	•	•	•	•	•	Last Configuration Change ID		•
						Multi Utility		
	•	•	•	•	•	Multi Utility Registers	•	
•	•	•	•	•	•	M-Bus Device n (n= 1 to 4)	•	
•	•	•	•	•	•	Multi Utility Profile n	•	
	•	•	•	•	•	Identification Numbers M-Bus Device n	•	
			•	•	•	Configuration M-Bus Device n	•	
			•	•	•	Extended Configuration M-Bus Device n	•	
						Communication		
		•	•	•	•	Physical Device Addresses	•	IEC
		•	•	•	•	IP Address	•	
		•	•	•	•	Ethernet MAC Address	•	
	•			•	•	CS/S0 Type	•	
			•	•	•	Optical Interface	•	•
					•	Maximum Retries and retry Timeout	•	
			•	•	•	Electrical Interface 1 and 2	•	
			•	•	•	Electrical Interface		•
			•	•	•	SMS Configuration	•	
			•	•	•	Mobile and SIM Card Identification	•	
						Remote Communication		
			•	•	•	General Settings	•	
			•	•	•	GSM Modem Settings	•	
			•	•	•	GPRS Modem Settings	•	
			•	•	•	TCP/IP Settings	•	
			•	•	•	PLC Settings	•	
						Extended Communication (CU only)		
			•	•	•	General Communication Settings	•	
			•	•	•	CU Modem Settings	•	

User Group								
Consumer (final customer)								
Field Inspection								
Reader								
Installation (field use)								
Engineering (laboratory use)								
Certification								
						Read Commands	**dlms**	**IEC**
			•	•	•	Mobile and SIM Card Identification	•	
			•	•	•	CU TCP/IP Settings	•	
			•	•	•	CU ADP Settings	•	
			•	•	•	IPT Status	•	
						Time of Use		
			•	•	•	Time of Use (TOU)	•	
			•	•	•	Extended Time of Use (TOU)	•	
			•	•	•	Passive TOU ID and Activation Date	•	
			•	•	•	Active TOU ID and Activation Date	•	
						Tariff control		
			•	•	•	Tariff Table	•	
						Disconnectors		
•	•	•	•	•	•	Electricity Disconnector	•	•
•	•	•	•	•	•	M-Bus Disconnector 1 to 4	•	
						Fraud Detection		
	•	•	•	•	•	Terminal Cover Counter	•	
	•	•	•	•	•	Strong DC Field Counter	•	
	•	•	•	•	•	Antitampering Event Log	•	
						Diagnostic Values		
		•	•	•	•	Operating Time Registers	•	
	•	•	•	•	•	Power Factor Registers	•	
		•	•	•	•	Power Factor Monitor Thresholds 1 and 2	•	
		•	•	•	•	Demand Monitor Thresholds	•	
		•	•	•	•	Battery Use Time 1 and 2	•	
		•	•	•	•	Battery Voltage	•	
•	•	•	•	•	•	Billing Period Counter	•	
•	•	•	•	•	•	Date and Time of Last Billing Period Reset	•	
•	•	•	•	•	•	Billing Period Reset Settings	•	
•	•	•	•	•	•	Energy Snapshot Counter	•	
•	•	•	•	•	•	Date and Time of Last Energy Snapshot	•	
•	•	•	•	•	•	Energy Snapshot Settings	•	
			•	•	•	Date and Time of Last Parameterisation	•	
			•	•	•	Number of Parameterisations	•	
			•	•	•	Date and Time of Last Calibration	•	
•	•	•	•	•	•	Pulse Output Constant		•
			•	•	•	Power Quality Functions	•	

						User Group		
						Consumer (final customer)		
						Field Inspection		
						Reader		
						Installation (field use)		
						Engineering (laboratory use)		
						Certification		
						Read Commands	**dlms**	**IEC**
			•	•	•	Maximum Demand Supervision	•	
			•	•	•	Current Supervision	•	
					•	Error Code	•	
					•	I/O Control Status	•	
					•	Internal Control Status	•	
					•	Internal Operating Status	•	
						Display and Readout Lists		
				•	•	Recall List		•
				•	•	Service List		•
				•	•	Readout List		•
				•	•	No Power Display List		•
					•	Auto Scroll Display List	•	
					•	Manual Scroll Display List	•	
					•	Engineering Menu Maximum Retries and Timeout	•	
					•	Consumer Message	•	
						Primary Value Adaptation		
	•		•	•	•	Primary Value Adaptation ZxQ	•	
						In Home Display		
•	•	•	•	•	•	In Home Display RF Address	•	
			•	•	•	In Home Display Parameters	•	
					•	Consumer Message	•	

Write Commands

User Group								
Consumer (final customer)								
Field Inspection								
Reader								
Installation (field use)								
Engineering (laboratory use)								
Verification								
						Write Commands	**dlms**	**IEC**
						Clock		
			•	•	•	Date and Time	•	•
			•	•	•	Set Date and Time to PC Time	•	
			•	•	•	Clock Base	•	
					•	DST Settings	•	•
					•	Clock Synchronisation	•	
			•	•	•	Date, Time and DST Flag		•
			•	•	•	Set Date and Time to PC Time		•
			•	•	•	Set Date and Time to PC Time (Jalaali)		•
			•	•	•	Day Counter and Season Number		•
						Profiles		
				•	•	Integration Period	•	
				•	•	Caption Periods	•	
•	•	•	•	•	•	Load Profile 1 and 2 Configuration	•	
						Identification Numbers		
			•	•	•	Identification Numbers 1.1 to 1.4	•	•
			•	•	•	Device ID 1 to 2 (utility serial number 1 to 2, ID 2.1 to 2.2)	•	
	•	•	•	•	•	Device ID 3 to 5 (utility serial number 3 to 5, ID 2.3 to 2.5)	•	
			•	•	•	Connection ID	•	
			•	•	•	Customer ID		•
			•	•	•	Meter ID		•
			•	•	•	Manufacturer ID		•
			•	•	•	Parameterisation ID	•	•
			•	•	•	Last Configuration Change ID		•
						Multi Utility		
		•	•	•	•	M-Bus Device n (n= 1 to 4)	•	
			•	•	•	Utility Serial Number 2 M-Bus Device n	•	
			•	•	•	Configuration M-Bus Device n	•	
			•	•	•	Extended Configuration M-Bus Device n	•	
			•	•	•	Install M-Bus Device n	•	
			•	•	•	Transfer Key to M-Bus Device n	•	
			•	•	•	Deinstall M-Bus Device n	•	

User Group								
						Consumer (final customer)		
						Field Inspection		
						Reader		
						Installation (field use)		
						Engineering (laboratory use)		
						Verification		
						Write Commands	**dlms**	**IEC**
						Communication		
			•	•	•	Physical Device Addresses	•	IEC
			•	•	•	Ethernet MAC Address	•	
				•	•	CS/S0 Type	•	
			•	•	•	Communication Input Settings	•	•
			•	•	•	Optical Port Lock		•
			•	•	•	Optical Interface	•	•
			•	•	•	Optical Interface Maximum Retries and Retry Timeout	•	
			•	•	•	Electrical Interface 1 and 2	•	
			•	•	•	Electrical Interface		•
			•	•	•	SMS Configuration	•	
						Remote Communication		
			•	•	•	General Settings	•	
			•	•	•	GSM Modem Settings	•	
			•	•	•	GPRS Modem Settings	•	
			•	•	•	TCP/IP Settings	•	
			•	•	•	PLC Settings	•	
						Extended Communication (CU only)		
			•	•	•	General Communication Settings	•	
			•	•	•	CU Modem Settings	•	
			•	•	•	CU TCP/IP Settings	•	
			•	•	•	CU ADP Settings	•	
						Time of Use		
				•	•	Set Activation Time of Passive TOU	•	
				•	•	Time of Use (TOU)	•	
				•	•	Extended Time of Use (TOU)	•	
						Tariff Control		
				•	•	Tariff Table	•	
			•	•	•	Rate control by electrical signal		•
			•	•	•	Rate control by electrical signal (inverted)		•
			•	•	•	Rate control by command		•
			•	•	•	Rate Switching		•
						Disconnectors		
	•	•	•	•	•	Electricity Disconnector	•	•

User Group								
						Consumer (final customer)		
						Field Inspection		
						Reader		
						Installation (field use)		
						Engineering (laboratory use)		
						Verification		
						Write Commands	**dlms**	**IEC**
	•	•	•	•	•	M-Bus Disconnector 1 to 4	•	
						Diagnostic Values		
			•	•	•	Billing Period Reset Settings	•	
			•	•	•	Energy Snapshot Settings	•	
			•	•	•	Power Factor Monitor Thresholds 1 and 2	•	
			•	•	•	Demand Monitor Thresholds	•	
			•	•	•	Single Reset Settings	•	
				•	•	Pulse Output Constant		•
			•	•	•	Power Quality Functions	•	
			•	•	•	Maximum Demand Supervision	•	
			•	•	•	Current Supervision	•	
						Passwords		
				•	•	Password Data Collection (Level 1)	•	
				•	•	Password Utility Field Service (Level 2)	•	
				•	•	Password IEC W5	•	•
				•	•	Password Extended Consumer (Level 5)	•	
				•	•	Password Management Access (Level G)	•	
				•	•	Password Remote Data Collection (Level 6)	•	
				•	•	Password Remote Service (Level 7)	•	
				•	•	Password User Defined (Level A)	•	
				•	•	Password Read Administrator (Level C)	•	
				•	•	Password Utility Administrator (Level D)	•	
				•	•	Password Distributor Service (Level E)	•	
				•	•	Password Level 1 Communication Unit	•	
				•	•	Password Level 2 Communication Unit	•	
				•	•	Password Level A Communication Unit	•	
				•	•	Encryption Key M-Bus Device 1 to 4	•	
					•	Password Optical Interface	•	
					•	Password Engineering Menu	•	
				•	•	Password P1		•
				•	•	Password P2		•
				•	•	Encryption Key P2		•
						Display and Readout Lists		
				•	•	Recall List		•

User Group								
Consumer (final customer)								
Field Inspection								
Reader								
Installation (field use)								
Engineering (laboratory use)								
Verification								
						Write Commands	**dlms**	**IEC**
				•	•	Service List		•
				•	•	Readout List		•
				•	•	No Power Display List		•
				•	•	Register Resolution		•
					•	Auto Scroll Display List	•	
					•	Manual Scroll Display List	•	
					•	Engineering Menu Maximum Retries and Timeout	•	
					•	Consumer Message	•	
						Primary Data Adaptation		
			•	•	•	Primary Data Adaptation ZxQ	•	
						In Home Display		
			•	•	•	Consumer Message	•	
			•	•	•	In Home Display RF Address	•	
			•	•	•	In Home Display Parameters	•	

Execute Commands

User Group								
Consumer (final customer)								
	Field Inspection							
		Reader						
			Installation (field use)					
				Engineering (laboratory use)				
					Verification			
						Execute Commands	**dlms**	**IEC**
		•	•	•	•	Billing Period Reset	•	•
		•	•	•	•	Take Energy Snapshot	•	
			•	•	•	Enable/Disable Testmode	•	•
			•	•	•	Enable/Disable Transm. Contacts Testmode	•	
			•	•	•	Activate Active Pulses on Right LED	•	
			•	•	•	Activate Reactive Pulses on Right LED	•	
				•	•	Enable/Disable Energy Registers in Display		•
			•	•	•	Neutralize Billing Period Reset Inputs (KA/KB)	•	•
			•	•	•	Reset Meter Data	•	
			•	•	•	Reset Alert	•	
			•	•	•	Reset Alarm	•	
			•	•	•	Reset DIP Table	•	
			•	•	•	Reset In Home Display Data	•	
			•	•	•	Activate Passive TOU Now	•	
			•	•	•	Activate New Parameters in Meter	•	
			•	•	•	Activate New Parameters in CU	•	
					•	Activate New Firmware in Meter	•	
					•	Activate New Firmware in CU	•	
			•	•	•	Reset Temper Flags		•
				•	•	Enable/Disable Energy Registers in Display		•
			•	•	•	Display Text Message		•
						Registers		
				•	•	Reset Billing Period Counter	•	•
				•	•	Reset Energy Snapshot Counter	•	
			•	•	•	Reset Operating Time 1 and 2 of Battery	•	•
				•	•	Reset all Registers and Profiles	•	
				•	•	Reset all Energy Registers	•	
				•	•	Reset Energy and Demand Registers		•
				•	•	Reset all Energy Total Registers	•	
				•	•	Reset all Multi Utility Registers	•	
				•	•	Reset Error Register	•	•
				•	•	Reset Alarm Register	•	

User Group								
						Consumer (final customer)		
						Field Inspection		
						Reader		
						Installation (field use)		
						Engineering (laboratory use)		
						Verification		
						Execute Commands	**dlms**	**IEC**
				•	•	Reset Diagnostic Registers	•	
				•	•	Reset Event Counters	•	
			•	•	•	Reset all Over and Undervoltage Counters	•	
			•	•	•	Reset all Over and Undercurrent Counters	•	
				•	•	Reset Demand Registers	•	
						Profiles		
				•	•	Reset Stored Values/Billing Data Profile	•	•
				•	•	Reset Energy Profiles	•	
				•	•	Reset Daily Snapshot Profile	•	
				•	•	Reset Load Profile 1	•	•
				•	•	Reset Load Profile 2	•	
				•	•	Reset Multi Utility Profiles	•	
				•	•	Reset all Profiles	•	
						Event Logs		
				•	•	Reset (Standard) Event Log	•	W5
	•		•	•	•	Reset all Dedicated Event Logs	•	
				•	•	Reset Disconnector Control Log	•	
	•		•	•	•	Reset Parameter Changes Log	•	
						Demand Monitoring		
	•		•	•	•	Reset Over Current Log	•	
	•		•	•	•	Reset Maximum Demand Logs (all 3)	•	
	•		•	•	•	Reset Demand Monitor 1-4 Log	•	
						Power Quality Monitoring		
	•		•	•	•	Reset Power Quality Log	•	
	•		•	•	•	Reset Overvoltage Log	•	
	•		•	•	•	Reset Undervoltage Log	•	
	•		•	•	•	Reset Phase Failure Log	•	
	•		•	•	•	Reset Power Failure Log	•	
	•		•	•	•	Reset Voltage Quality Losses Logs (all 3)	•	
						Fraud Monitoring		
	•		•	•	•	Reset Fraud Detection Log	•	
	•		•	•	•	Reset Strong DC Field Detection Log	•	
	•		•	•	•	Reset Front Cover Removal Log	•	
	•		•	•	•	Reset Terminal Cover Removal Log	•	

User Group								
						Consumer (final customer)		
	•		•	•	•	Reset Phase Sequence Reversal Log	•	
	•		•	•	•	Reset Negative Active Energy Flow Log	•	
	•		•	•	•	Reset Current with Undervoltage Log	•	
	•		•	•	•	Reset Open/Shortened CT Log	•	
	•		•	•	•	Reset Undercurrent Log	•	
	•		•	•	•	Reset Overcurrent in Neutral Log	•	
						Communication Monitoring		
	•		•	•	•	Reset M-Bus Event Log	•	
	•		•	•	•	Reset Remote Communication Event Log	•	
•	•	•	•	•	•	Reset Received Signal Strength Profile	•	
						Communication		
			•	•	•	SMS Test	•	
	•	•	•	•	•	Enable/Disable Field Strength Indication	•	
	•	•	•	•	•	Activate GPRS communication	•	
	•	•	•	•	•	Close current GPRS window	•	
	•	•	•	•	•	Close all GPRS windows	•	
	•	•	•	•	•	Set to 'PLC NEW' State	•	
					•	Leave ZigBee Network	•	
						Fraud Detection		
	•		•	•	•	Reset Terminal Cover Counter	•	
	•		•	•	•	Reset Strong DC Field Counter	•	
	•		•	•	•	Reset Antitampering Event Log	•	
					•	Reset Optical Interface Unsuccessful Retries Counter	•	
					•	Reset Engineering Menu Unsuccessful Retries Counter	•	
						Firmware Update		
					•	Firmware Update AD-xP/xG 3.x	•	
					•	Firmware Update E450 and AD-xE	•	
					•	Firmware Update CU-P4	•	

Diagnostic Commands

User Group								
Consumer (final customer)								
	Field Inspection							
		Reader						
			Installation (field use)					
				Engineering (laboratory use)				
					Verification			
						Diagnostic Commands	**dlms**	**IEC**
	•	•	•	•	•	Vector Diagram	•	
	•	•	•	•	•	CU GSM Installation Support	•	
	•	•	•	•	•	GSM Installation Support	•	
		•	•	•	•	DIP Table	•	
			•	•	•	Security System *	•	
•	•	•	•	•	•	Load Profile Analysis *	•	

* MS Excel is required to perform these diagnostic functions.

13 List of Abbreviations

This section explains some abbreviations used in this user manual or on dialogue windows of the Landis+Gyr .MAP110 application in alphabetical order.

Please consult also the metering glossary published on the Landis+Gyr homepage www.landisgyr.eu under "Support" → "Metering Glossary".

Abbreviation	Definition Description
dlms	**Distribution Line Message Specification** Messaging system defined originally as part of the application layer of the protocol stack for distribution line carrier systems (IEC 61334-4-41, 1996). Its universality and its independence of the actual communication channel allowed dlms to become the choice of the metering industry for any metering application (Device Language Message Specification).
EDIS	**Energy Data Identification System** Identification number system for clear identification of energy data according to DIN 43863-3:1997.
GSM	**Global System for Mobile communications** Wireless communication network for data and voice transmission.
HDLC	**High Level Data Link Control** Communication protocol used by COSEM (IEC 62056-46), specifying the data link layer. The HDLC standard is ISO/IEC 13239, 2000 (second edition). Some older COSEM implementations rely on the first, 1996 edition of the standard.
IEC	**International Electrotechnical Commission** IEC 62056-21 is the standard "Electricity metering - Data exchange for meter reading, tariff and load control - Part 21: Direct local data exchange". This is the third edition of the formerly well-known standard IEC 61107 (IEC 1107).
.MAP	**Meter Application Product** The .MAP software tools have been developed and distributed by Landis+Gyr to support electricity meters. This group of tools comprises the .MAP 110 Service Tool and the .MAP120 Parameter Editor.
OBIS	**Object Identification System** Identification number system for clear identification of dlms items.
PSTN	**Public Switched Telephone Network** The public switched telephone network can be used for data transmission. To this purpose a modem (modulator/demodulator) must be inserted between computer and telephone network and also between the telephone network and the remote device.
VDEW	**Vereinigung Deutscher Elektrizitätswerke** VDEW is the central organisation of the German electrical industry. It combines and represents the interests of its members and is consultant and forward-looking body for energy questions (refer also to www.strom.de).

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Landis+Gyr
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