SERVICE TOOL

Landis+Gyr

MAP110
USER MANUAL

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Revision History

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a	28.02.2005	First edition
b	31.05.2005	Changes to release 1.1
c	22.09.2005	Changes to release 1.2

subject to technical changes

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Introduction

Scope

The present user manual is designed for the Landis+Gyr MAP110 Service Tool **Version 1.2**.

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 the system planning, parameter setting and installation of meters.

Conditions

The Landis+Gyr MAP110 Service Tool runs on personal computers with the 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 personal computer. Furthermore, you need to be familiar with the functional principles of the various meters supported by the Landis+Gyr MAP110 Service Tool, which are described in the corresponding user manuals.

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.

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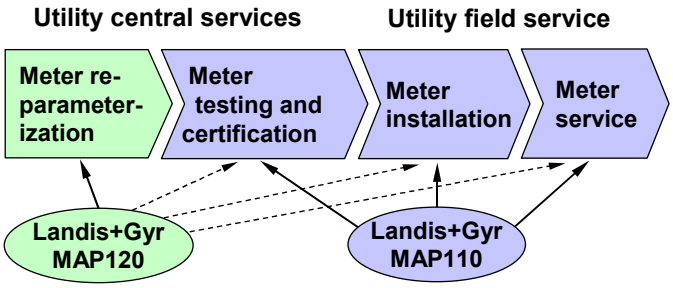
1 Overview

The Landis+Gyr MAP110 Service Tool is used for reading out billing data and profiles and for changing the most important device parameters. It is able to communicate with all modern electronic meters from Landis+Gyr, which comply with the standards under dlms or IEC 62056-21 (formerly IEC 1107). The Landis+Gyr MAP110 Service Tool is therefore the ideal tool for the service technician.

The following diagram illustrates the various fields of application of the Landis+Gyr MAP110 Service Tool for power supply companies. The field of application of the Landis+Gyr MAP120 Parameterization Tool is also shown.



Most functions of the Landis+Gyr MAP110 Service Tool can also be performed with the Landis+Gyr MAP120 Parameterization Tool. The ease of operation of the Landis+Gyr MAP110 Service Tool is significantly simpler, however, so that its use is recommended.

1.1 Functions

The range of functions of the Landis+Gyr MAP110 Service Tool covers all the following applications normally required for meter installation and in the service sector:

- Billing data readout
- Readout and export of profiles (load profile, stored values and event log)
- Parameter readout and modification
- GSM installation aid for Landis+Gyr communication units (field strength indicators, telephone number information, pin-code handling)
- Analysis and diagnostic functions

1.2 User Groups

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:

- Certification (verification authority)
- Engineering (laboratory use)
- Installation (field use)
- Reader (local and remote)
- Consumer (final customer)

The user group is determined by the licence data (see chapter 3 "Licensing"). Each license exclusively applies to an individual user group.

1.3 Functional Range

Only the time and date can be read from the meter with the unlicensed demo version.

The following functions can be performed with all licensed versions depending on the meter type connected:

- With Landis+Gyr **dlms** meters (use of dlms protocol)
  - read commands
  - write commands
  - execution commands and
  - diagnostic functions.
- With Landis+Gyr **IEC** meters (use of IEC protocol)
  - read commands
  - write commands and
  - execution commands.

The meter connected must support the relevant function for successful application of a function.

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

2 Installation

This chapter describes the installation of the Landis+Gyr MAP110 Service Tool on the hard disk of your personal computer.

System requirements

To be able to run the Landis+Gyr MAP110 Service Tool, your personal computer must meet the following minimum requirements:

- Pentium processor with > 400 MHz
- 128 MB of RAM
- 40 MB of free space on the hard disk
- 256 color VGA graphics card and monitor
- CD drive (if software delivered on CD)
- Pointing device (mouse)
- Operating system Windows Server 2003, Windows XP, Windows 2000, Windows 98SE, Windows ME or Windows NT with Service Pack 6a
- Internet Explorer 5.01 or higher must be installed
- .NET Framework is required. If this is not already installed, it is added by the MAP110 installation program.
- MS Excel 2000 or higher must be installed for enhanced diagnostic functions.

Installation software

The corresponding installation software is required to install the Landis+Gyr MAP110 Service Tool. This can either be found on the installation CD "Landis+Gyr MAP110" or it can be downloaded to your PC via the Internet from the homepage www.landisgyr.com.

Notes

Administration rights are required for the installation, if the Windows NT, 2000 or XP operating system is used on your PC.

If a version of the Landis+Gyr MAP110 Service Tool is already installed on your computer, this must be removed before installation.

Language

The required language must be entered when installing. Please note that this can no longer be changed later in the application. A new installation is necessary for any later change of language.

All open Windows applications must be closed before installation.

Procedure

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

Start the installation file "Setup.exe" and then follow the instructions on the screen.

3 Licensing

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

3.1 Licensing Concept

Following installation of the Landis+Gyr MAP110 Service Tool the application is in the unlicensed state, i.e. it can only be used as demo version with reduced range of functions. In order to permit use of the Landis+Gyr MAP110 Service Tool without restrictions, it must be licensed for the intended use. 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 chapter 3.2 "Entering License Data".

The user group determines the functional range of the Landis+Gyr MAP110 Service Tool. The following user groups exist:

- Demo
- Certification
- Engineering
- Installation
- Reader
- Consumer

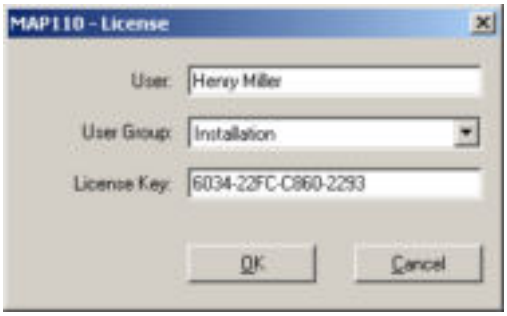
3.2 Entering License Data

This chapter 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.

Procedure:

1. Click on **Start** and then select the **Landis+Gyr MAP110** command from the menu **Programs**, **Landis+Gyr MAP110**.
   The Landis+Gyr MAP110 Service Tool is started.

2. Select **License...** from the **Extras** menu.
   The "MAP110 - License" window appears.
3. Enter the user name provided by Landis+Gyr in the "User" 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 licensing procedure is terminated. The meter types accessible for the user group specified can be selected in the "Select Meter Type" box and the commands available are displayed in the command tree.

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

Note

Keep the license key in a safe place

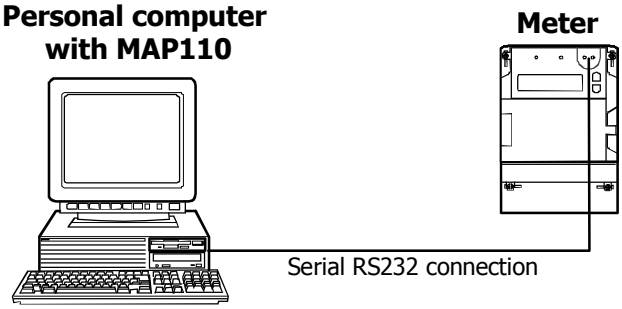
Please note that due to security reasons the license key is not shown anymore if the "License" window is reopened. Keep the license key in a safe place for further use.

3.3 Changing the License

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

4 First Steps

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



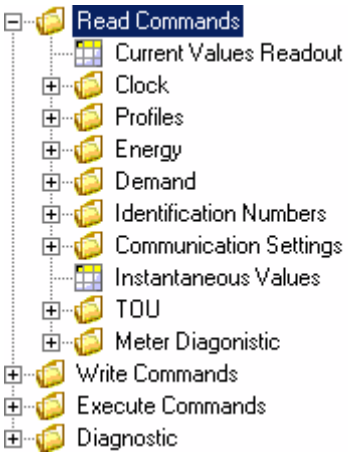
A meter ready for operation and an optical reading head for connection to a serial interface are required for this purpose. The Landis+Gyr MAP110 Service Tool must also be installed on the PC.

Procedure:

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

3. In the selection box "Select Meter Type" select the meter type "dlms meters".

4. Open the "Read Commands" folder in the command tree.
   For this purpose click the symbol ⊞ before the "Read Commands" folder or double-click on the folder symbol .
   The commands available are displayed, e.g. for the "Installation" user group the read commands for dlms meters:

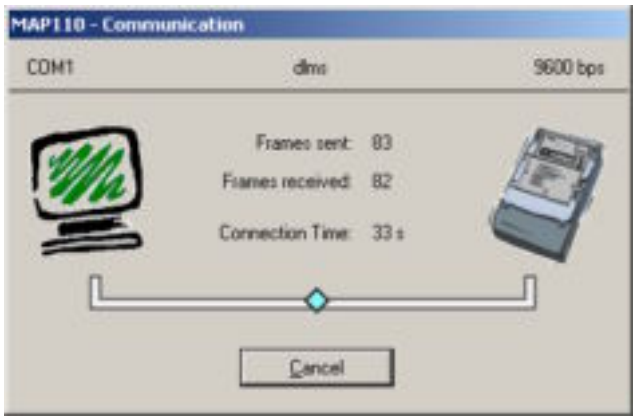


5. Select the "Current Values Readout" command in the command tree under "Read Commands" for dlms meters.

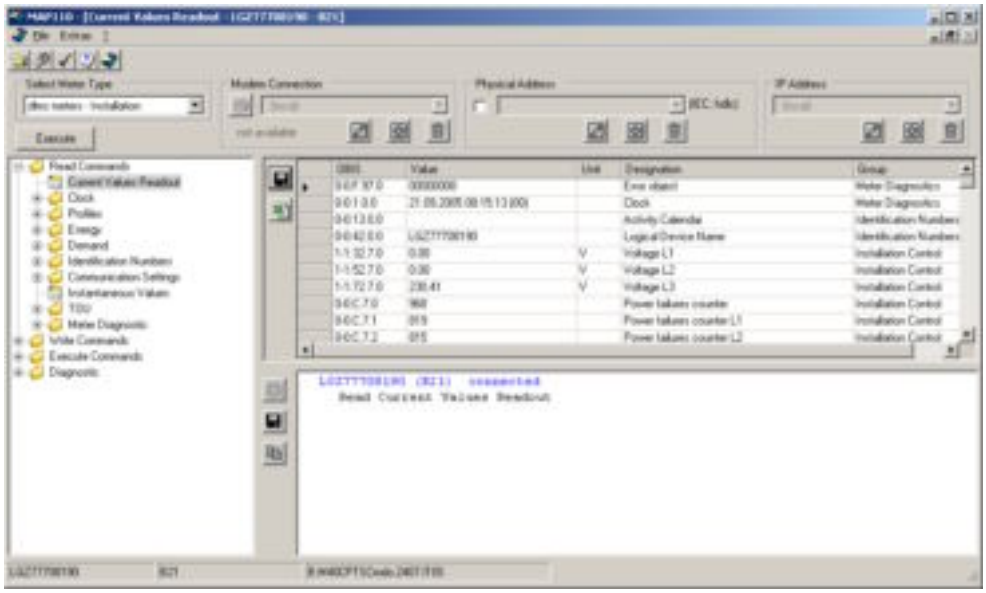
   A command can be selected in various ways:

   - double-click on the command or
   - mark the command by clicking it and then click on the "Execute" button above the command tree or
   - click on the command with the right mouse button and then select the item "Execute..." in the pop-up menu appearing.

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



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



6. 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 chapters.

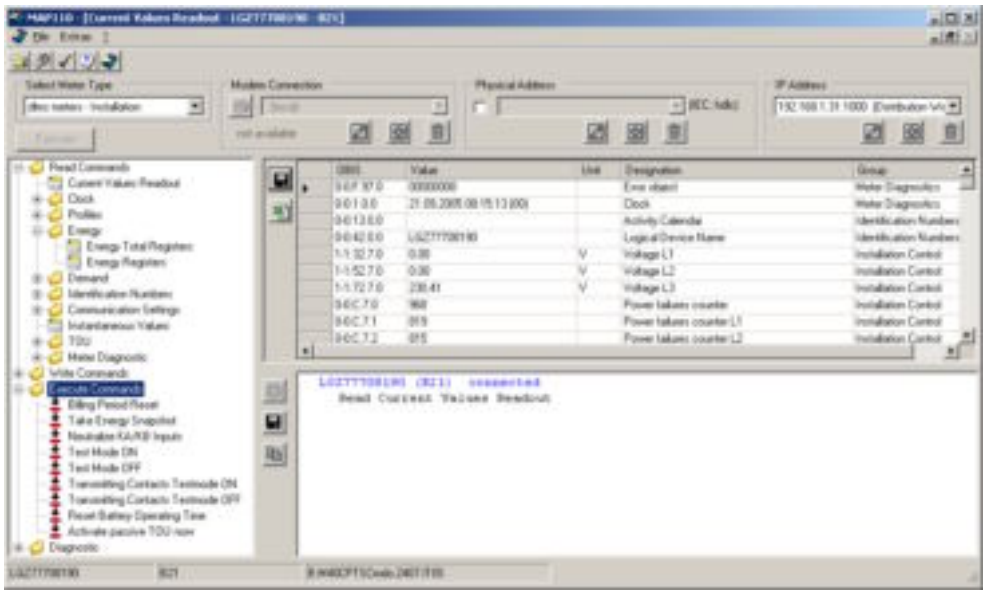
5 Description of User Interface

This chapter 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 with the "File", "Extras" and "?" menus to call up functions.
- Tool bar with buttons for direct call-up of functions frequently used.
- Selection box "Select Meter Type" for selecting the meter type (dlms or IEC)
- Selection box "Modem Connection" for recording, deleting and selecting modem connections.
- Selection box "Physical Address" for recording, deleting and selecting physical device addresses.
- Selection box "IP Address" for recording, deleting and selecting IP addresses.
- Command tree (left-hand half of window)
- Display window for results (right-hand half of window, top)
- Trace window (log) for recording events, results, error messages, etc. (right-hand half of window, bottom)
- Status bar for displaying characteristic data of the meter connected.
- Evaluation window.



The sizes of the areas for the command tree, display window and trace window can be set individually with the movable separating bars situated in between (click separating bar and move with mouse button pressed).

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 display or trace window data, for opening data saved in the display or trace windows and for ending the application.
- **Extras** menu to call up functions for licensing, communication setting, option setting and emphasising commands available in the command tree.
- **?** menu to call up online help and version display.

5.3 Tool Bar

The tool bar of the Landis+Gyr MAP110 Service Tool contains the following buttons for direct call-up of functions frequently required:

 calls up the function to open data saved in the display or trace window

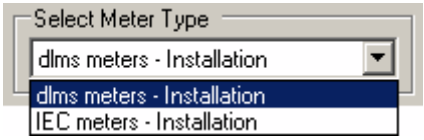
 calls up the function for communication settings

 switches emphasis of commands available in the command tree on or off

 calls up online help

 calls up the version display

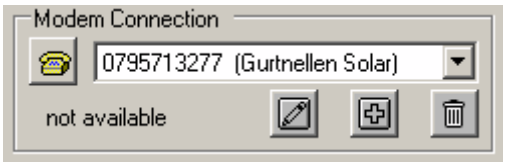
5.4 Selection Box "Select Meter Type"



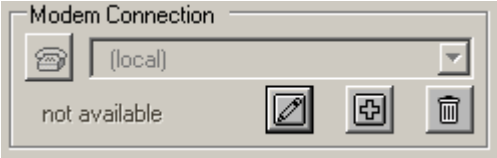
Selection can be made between meter types "dlms meters" and "IEC meters" in the "Select Meter Type" box for various user groups depending on the type of licensing.

Various commands are offered in the command tree corresponding to the selection made (see also chapter 12 "Functional Range per User Group").

5.5 Selection Box "Modem Connection"



The call number of the required modem can be selected in the "Modem Connection" selection box, if a modem is selected as interface in the communication settings. Otherwise the area is deactivated, i.e. set for a local connection.



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

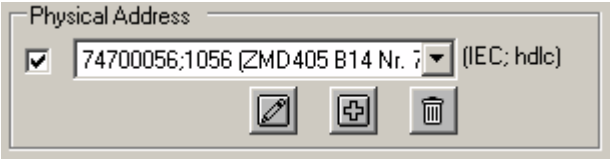
Clicking  interrupts the modem connection.

Clicking  opens the "MAP110 - Add Modem Connection" window, in which a new call number and associated designation can be recorded.

Clicking  opens the "MAP110 - Edit Modem Connection" window, in which the entry selected in the selection field can be modified.

Clicking  deletes the entry selected in the selection box.

5.6 Selection Box "Physical Address"



The physical device addresses for the required meter can be selected in the "Physical Address" selection box, provided the check box is marked.

The physical device address is required for addressing meters with multiple connection. It is also used as device access protection.

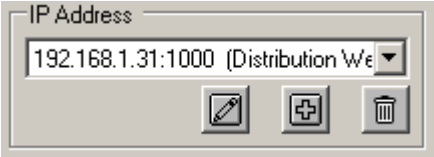
The selection available is assigned to a specific communication connection, e.g. to the local connection or a modem connection selected. This ensures that only the addresses recorded for this connection can be selected.

Clicking  opens the "MAP110 - Add Physical Address" window, in which a new physical IEC and HDLC device address and an associated designation can be recorded.

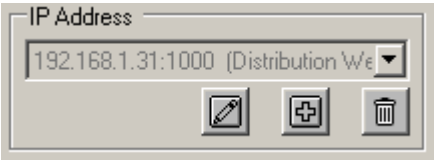
Clicking  opens the "MAP110 - Edit Physical Address" window, in which the entry selected in the selection field can be modified.

Clicking  deletes the entry selected in the selection box.

5.7 Selection Box "IP Address"



The IP address and port number of the communication unit of the required meter can be selected in the "IP Address" selection box, provided the interface "Ethernet" is selected in the communication profile settings. Otherwise the area is deactivated.

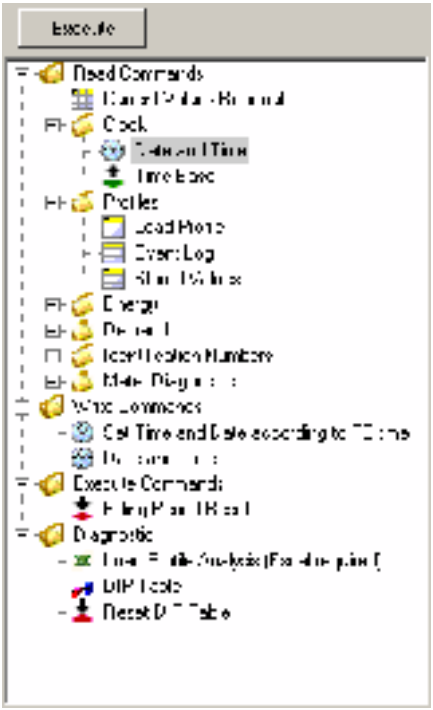


Clicking  opens the "MAP110 - Add IP Address" window, in which a new IP address and port number and an associated designation can be recorded.

Clicking  opens the "MAP110 - Edit IP Address" window, in which the entry selected in the selection field can be modified.

Clicking  deletes the entry selected in the selection box.

5.8 Command Tree



All commands available for the user group and meter type set (see also chapter 5.4 "Selection Box "Select Meter Type") are displayed in a tree representation.

Tree representation

A tree representation, e.g. as generally familiar from the file system tree of Windows Explorer, is ideally suited for clear presentation of ordered structures (e.g. of files placed in folders and sub-folders).

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 represented as follows:

- Folders
- Read commands for values (meter 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 ⊟.

To expand or collapse 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 **"/" key** of the numerical keyboard collapses the whole tree below the selected folder (i.e. all subfolders and commands will no longer be visible).
- Pressing the **"+" or "-" key** of the numerical keyboard toggles between the expanded and collapsed tree representation.

Emphasising commands available in the command tree

The commands available are emphasised by clicking  or by selecting the relevant menu item in the **Extras** menu. All commands not available in the meter are then marked in color (grey in the example below). The identification color can be set under **Options...** in the **Extras** menu (see chapter 7.5.3 "Setting Color for Inactive Commands").

All commands are displayed again normally by clicking  again or by selecting the relevant menu item again in the **Extras** menu.

If there is no connection to a meter, all commands are shown unavailable for local connections when this function is selected. The commands can be selected, however, e.g. read out a value. The commands not available are then correctly displayed corresponding to the meter connected.

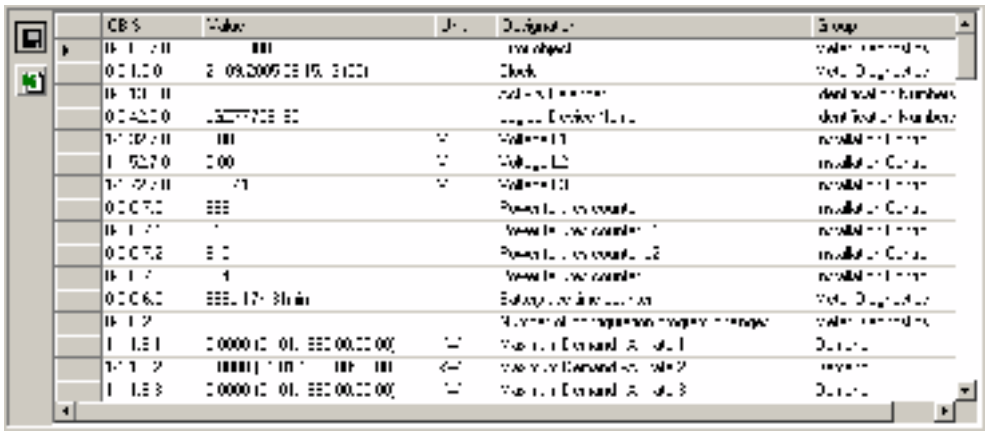
Command execution

A command can be executed in various ways:

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

5.9 Display Window

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



The data can either be displayed by readout from a meter 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 key).

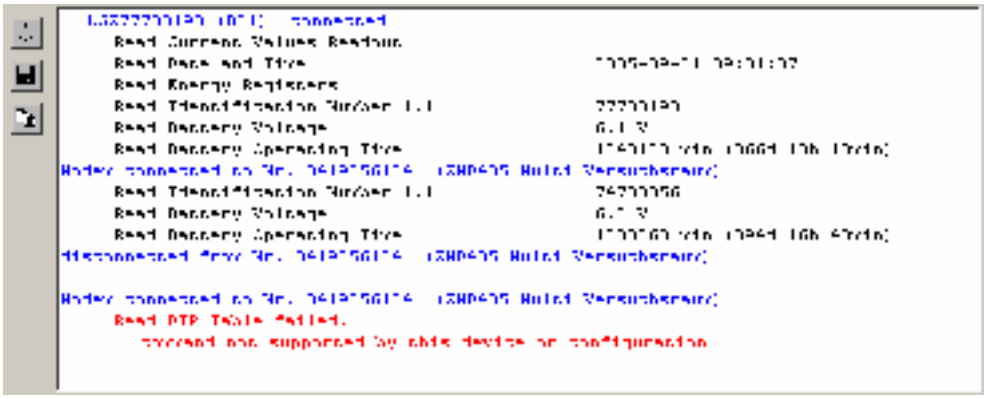
Clicking on  or with the right mouse key in the display window and then selecting the **Save as...** menu item in the pop-up menu appearing opens the "Save as" dialogue window to save the data displayed in a freely selected directory either as XML file (default) or as text file.

Clicking on  or clicking with the right mouse key in the display window and then selecting the **Open with Excel** menu item in the pop-up menu appearing exports the data displayed for any desired further processing in the Excel table calculation program.

Provided no data are yet shown in the display window, e.g. after starting the Landis+Gyr MAP110 Service Tool, the following background picture can be seen in the display window and the two buttons are not displayed.

5.10 Trace Window

In the trace 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 display area (e.g. readout of current values) or as evaluation in its own window (e.g. vector diagram).

Clicking on  or clicking with the right mouse button in the trace window followed by selection of the **Clear** menu item in the pop-up menu appearing deletes the contents of the trace window.

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

Clicking on  or clicking with the right mouse button in the trace window followed by selection of the **Copy** menu item in the pop-up menu appearing copies the contents of the trace window to the Windows clipboard, from where it can be inserted in another application (e.g. in a word processing program).

The contents of the trace 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 clicking on  in the symbol bar or by selecting the **Open...** entry in the **File** menu protocols previously saved can be displayed again in the trace window.

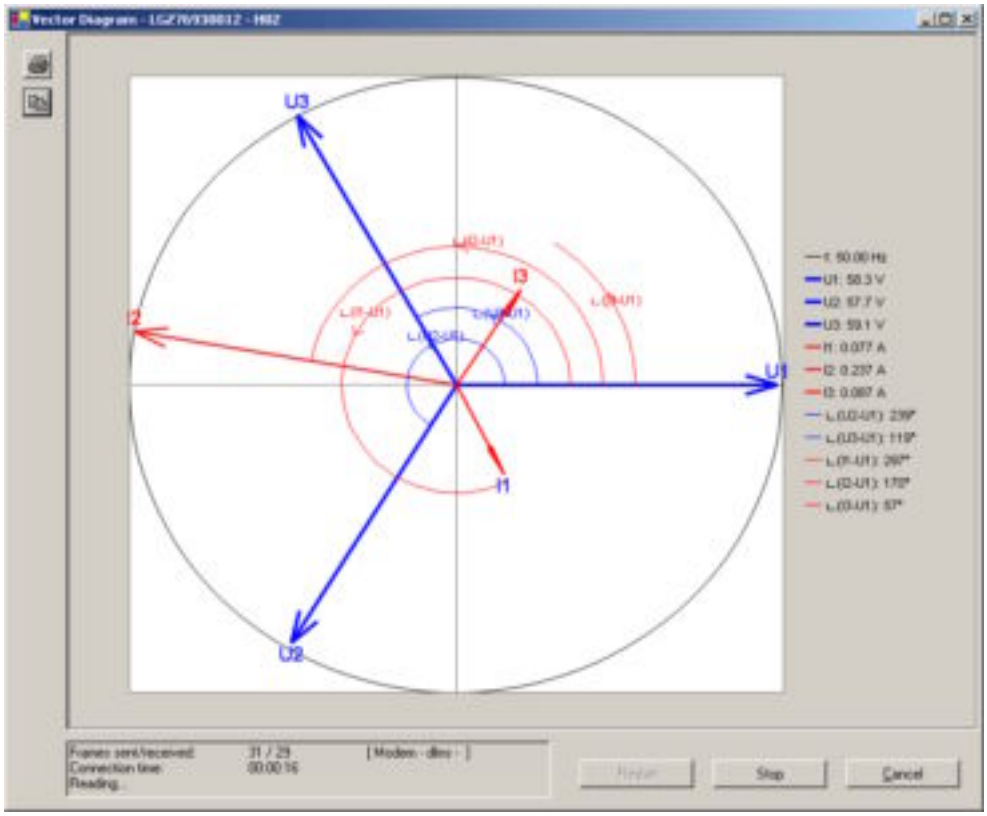
5.11 Status Bar

The following meter data are displayed in the status bar as soon as connection is made to the meter, i.e. as soon as the modem connection has been made or at least one command has been executed via local connection:

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

5.12 Evaluation Window

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



6 Communication with Meters

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

6.1 Interface to Meter

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

- With an optical **reading head** placed at the optical interface of the meter (only point-to-point connection to a meter possible).
- With a **direct connection** to a meter, e.g. via an RS232 or Ethernet interface as used in various communication units. If the communication unit has a second interface, multiple connections are possible to further meters.
- With a **modem connection** to a meter or several meters, 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 **TCP/IP connection** over the Internet via iMEGA server to a meter or several meters, if these are connected together by a multiple connection by RS485, CS or M-bus. Note: For TCP/IP connections over the Internet via iMEGA server a virtual COM port and a corresponding standard modem driver must have been installed.

The connection to a PC with the MAP110 software is made either via a serial interface (e.g. COM-port or USB) or via a modem connected.

6.2 Communication Settings

The communication settings in the Landis+Gyr MAP110 Service Tool comprise the following points:

- Selection of a communication profile with connection specifications such as:
  - interface used
  - type of interface
  - transmission rate
  - start protocol
  - network delay times
- Selection of access levels for read and write access
- Specification of passwords for the various access levels

Connection profiles must also be specified for modem and multiple connections. These contain the telephone dialing numbers for modem connections and the physical device addresses for multiple connections.

For a better understanding of the possible settings in the Landis+Gyr MAP110 Service Tool some important terms and communication parameters are explained below, before the completion of various communication connections is shown by means of examples in chapter 6.3 "Communication Examples".

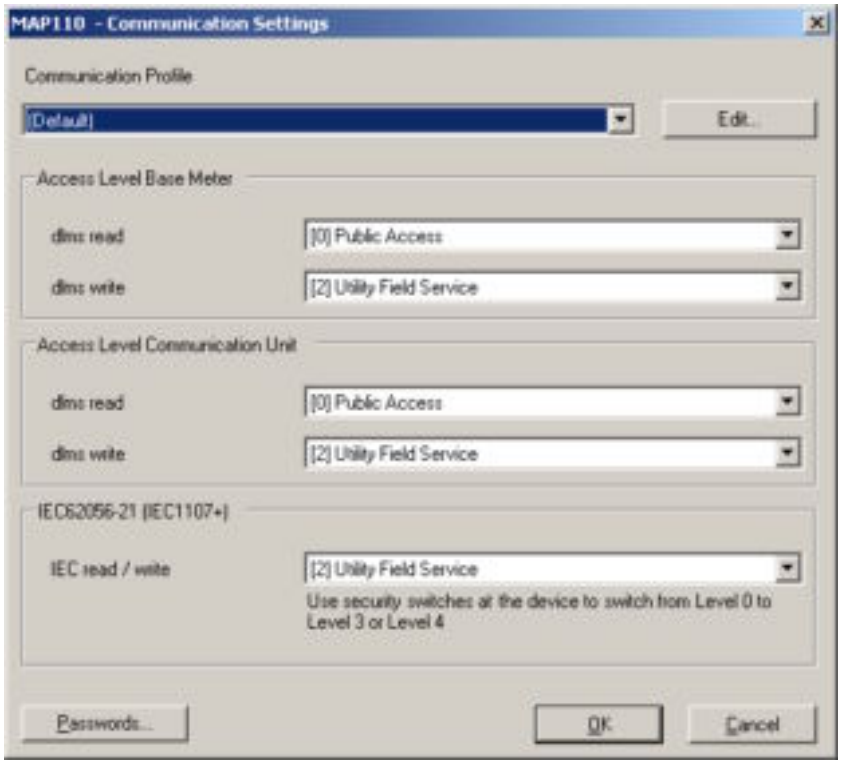
6.2.1 Communication Profiles

A communication profile must be determined or selected in the MAP110 Service Tool for every communication connection to a meter. With the choice of a stored communication profile all settings no longer have to be made separately each time. Any desired number of communication profiles can be specified and stored.

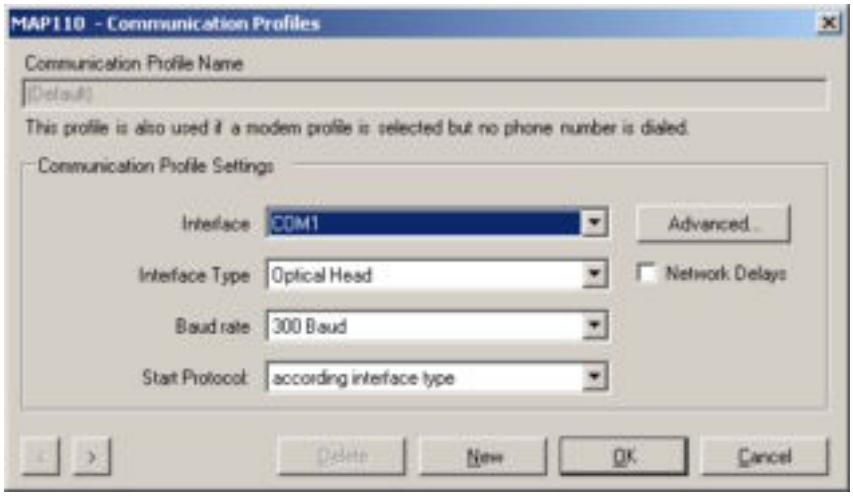
Preparation example

The following basic procedure should be adopted to produce and store a new communication profile (specific examples are given in chapter 6.3 "Communication Examples"):

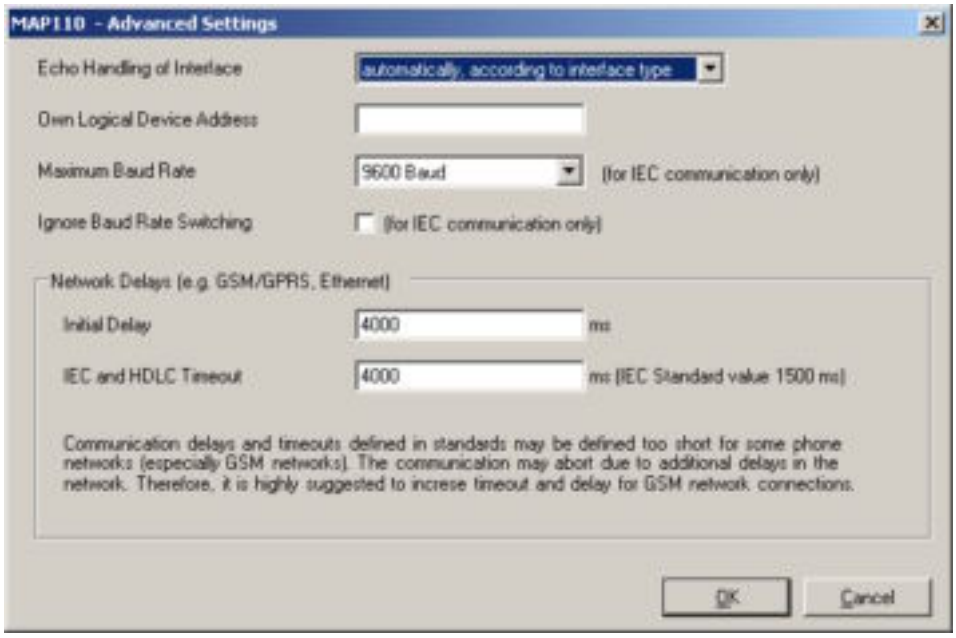
1. Click on  in the tool bar or select **Communication Settings...** from the **Extras** menu.
   The "MAP110 - Communication Settings" window appears.



2. Click on **Edit...**.
   The "MAP110 - Communication Profiles" window appears.



3. Click on **New**.
   The window is ready for determining a new communication profile.
4. Enter a name for the new communication profile in the entry box "Communication Profile Name".
5. Select the serial interface to be used in the "Interface" selection box or the modem used for remote communication and for Ethernet connections the entry "Ethernet".
6. Select the "Optical Head", "3-wire connection without echo" or "Bluetooth Optical head" type used in the "Interface Type" selection box for local communication, depending on how the meter is connected. The selection box is inactive 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 suitable means in the MAP110, while this effect does not occur with a direct connection.
7. Select the transmission rate corresponding to the meter in the "Baud Rate" selection box for local communication. The selection box is inactive for modem connections.
8. Select the necessary start protocol for the planned activity in the "Start Protocol" selection box. Possible settings:
   - **according interface type** (default), i.e. IEC protocol, if an optical reader is used or HDLC protocol if a direct connection is used
   - **IEC**, if the IEC protocol must be used without fail
   - **HDLC**, if the HDLC protocol must be used without fail
9. If the network delay time set to 1500 ms as standard is to be changed, activate the "Network Delays" check box. The required delay times must then be entered as advanced communication settings.
10. If advanced communication settings are necessary, click on **Advanced...**. The "MAP110 - Advanced Settings" window appears.



11. Perform the required advanced communication settings.

    Possible settings in the "Echo Handling of Interface" selection box:

    - **automatically, according to interface type** (default), i.e. with echo, if an optical reading head is used or without echo, if a direct connection is made
    - **with echo (e.g. optical head)**, if a direct connection is used, which causes an echo
    - **without echo (e.g. electrical interface)**, if an optical reader is used, which causes no echo

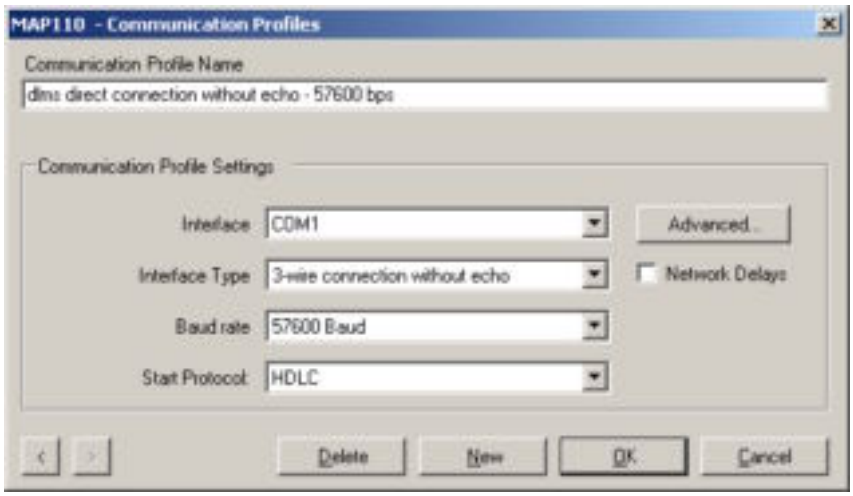
    This address can be entered in the "Own Logical Device Address" entry box, if it must be notified to the opposite station, e.g. for identification purposes.

    The maximum transmission rate can be selected in the "Maximum Baud Rate" selection box for the IEC protocol (default = 9600).

    If the check box "Ignore Baud Rate Switching" is activated with IEC protocol selected, the starting baud rate selected is permanently retained. This is necessary, for example, for communication with meters, which must be contacted via a multiple connection with a lower transmission rate than required by the modem circuit.

    The initial delay and timeout time for problems in making connection, e.g. with GSM networks, can be set in the "Initial Delay" and "IEC and HDLC Timeout" entry boxes. Note that the "Network Delays" check box in the "Communication Profiles" window must also be activated for this setting to be effective (otherwise the standard values of 1500 ms remain effective).

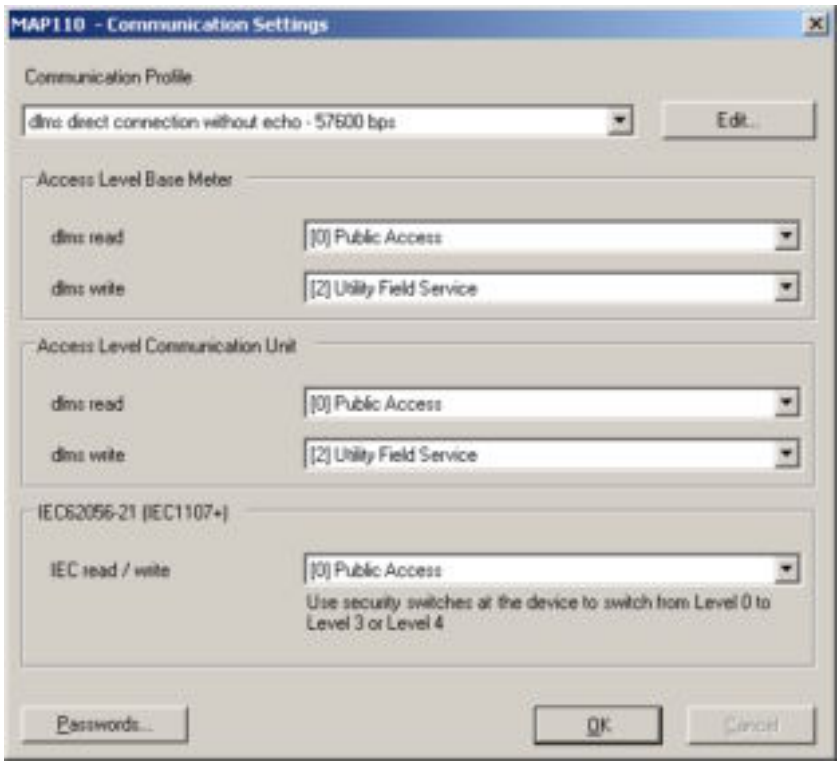
12. Click on **OK**.
    The "MAP110 - Advanced Settings" window disappears again.



13. Click on **OK**.
    The new communication profile is stored and then appears as entry in the "Communication Profile" selection box in the "MAP110 - Communication Settings" window.

6.2.2 Access Levels

The access levels to a meter should be selected in the "Communication Settings" window for each communication setting (one each for read and write via dlms for the base meter and for the communication unit and one each for read and write via IEC).

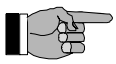


The various access levels and their fields of application are described in chapter 10 "Short Description of Meter Security System".

Any passwords necessary can be changed in the "MAP110 - Passwords" window, which appears after clicking **Passwords...**.

The following default passwords are defined (not displayed):

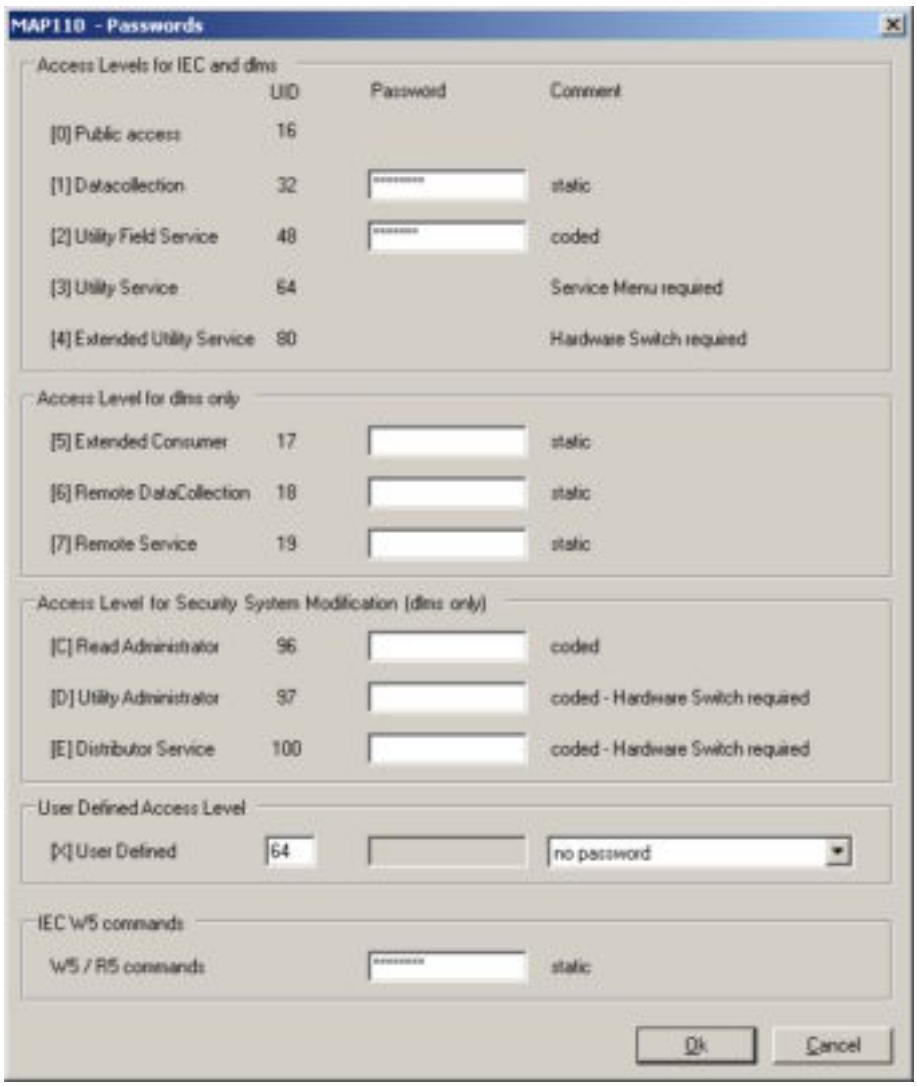
- **00000000** as static password for access level 1
- **1234567** as coded password for access level 2



Note

Changing default passwords

Landis+Gyr recommends that the generally known default passwords in the meter should be changed.



6.2.3 Addressing Meters

For point-to-point connections the meter need not be specially addressed. But with multi-drop all meters connected to the bus system (RS485, CS or M-Bus) 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 meter), 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 stored as parameters of the basic meter and not in the communication unit. A change of communication unit does not therefore affect the addressing. These parameters can be found under "Identification numbers". With the Landis+Gyr MAP110 Service Tool the physical device addresses of the meters can be modified with the write commands under "Communication Settings".

6.3 Communication Examples

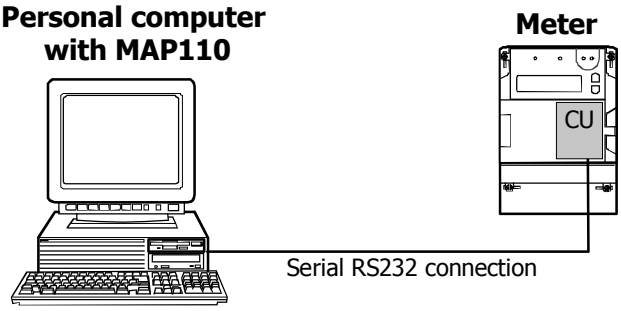
This chapter provides some examples to show how communication connections are made to meters via various communication paths and for various applications. It is assumed in all examples that the physical connections (e.g. cable or modem connections) have already been made and the Landis+Gyr MAP110 Service Tool has already been started.

6.3.1 Local Point-to-Point Connection via Optical Reading Head

An example of a point-to-point connection to a single meter via an optical reading head is given in chapter 4 "First Steps".

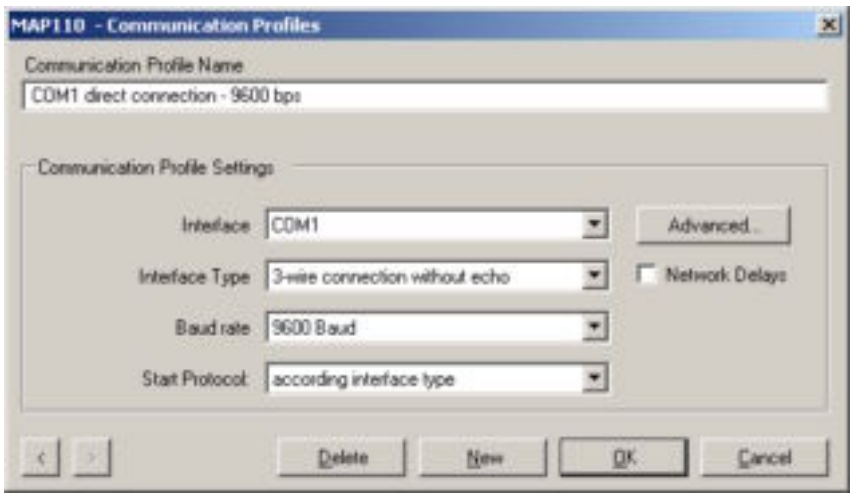
6.3.2 Local Point-to-Point Connection via RS232 Interface

This example shows how a point-to-point connection is made to a single meter.

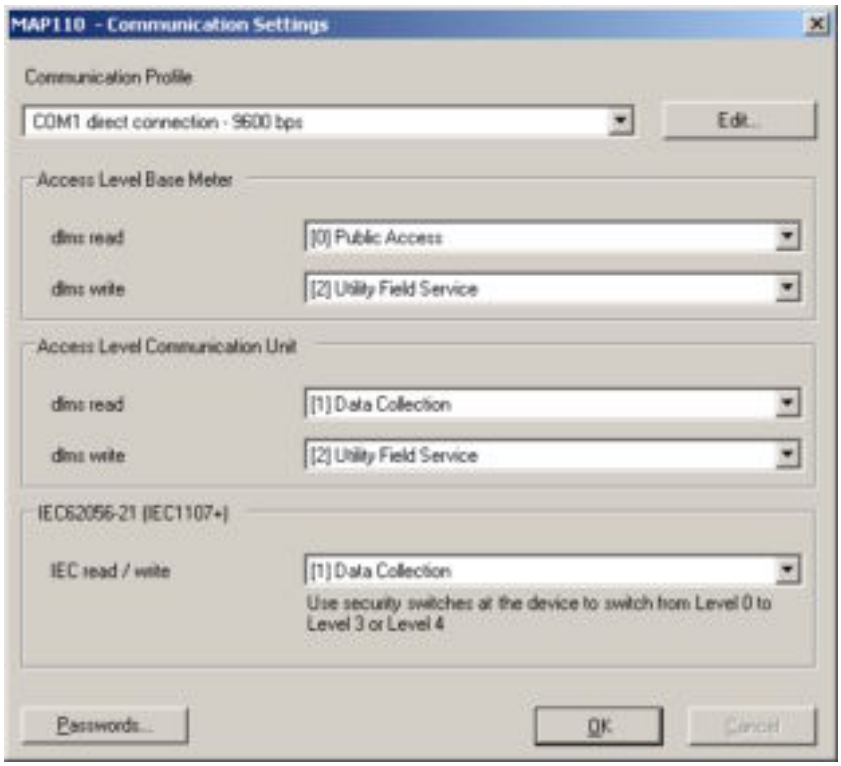


Procedure:

1. Click on  in the tool bar or select **Communication Settings...** from the **Extras** menu.
   The "MAP110 - Communication Settings" window appears showing the settings last used.
2. Select or create a communication profile with the following settings (for procedure see chapter 6.2.1 "Communication Profiles"):
   - Selection box "Interface": serial interface, to which the connection cable to the RS232 interface of the meter is connected, e.g. COM1.
   - Selection box "Interface Type": 3-wire connection without echo.
   - Selection box "Baud Rate": Transmission rate according to the parameter settings of the communication unit in the meter, e.g. 9600.
   - Selection box "Start Protocol": According interface type.



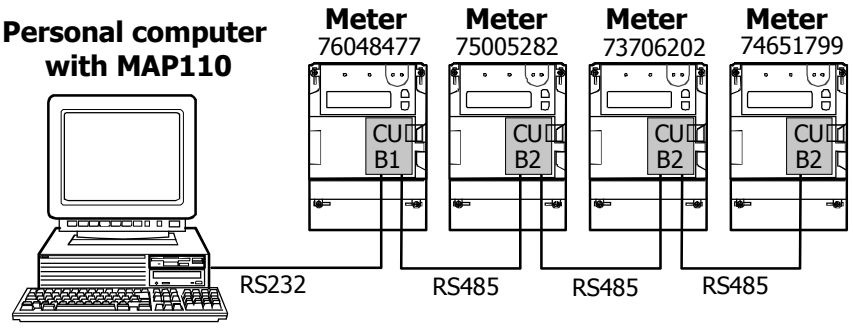
3. Select the required access levels for the intended activity in the relevant selection boxes of the "MAP110 - Communication Settings" window.



4. Click on **OK**.
   The communication settings are applied and the "MAP110 - Communication Settings" window disappears again.
5. Select the meter type "dlms meters" or "IEC meters" in the "Select Meter Type" selection box corresponding to the characteristics of the meter connected.
6. Select the required command in the command tree.
   Communication is started and the command executed.

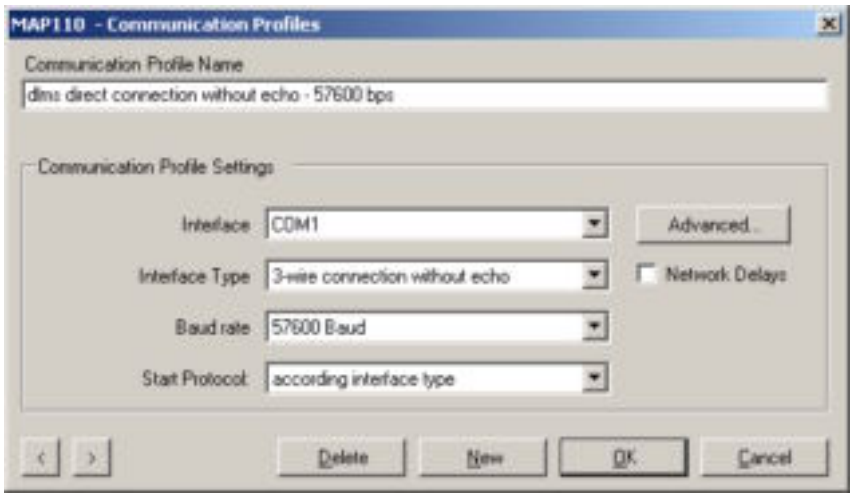
6.3.3 Local Multiple Connections via RS232/RS485 Interfaces

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

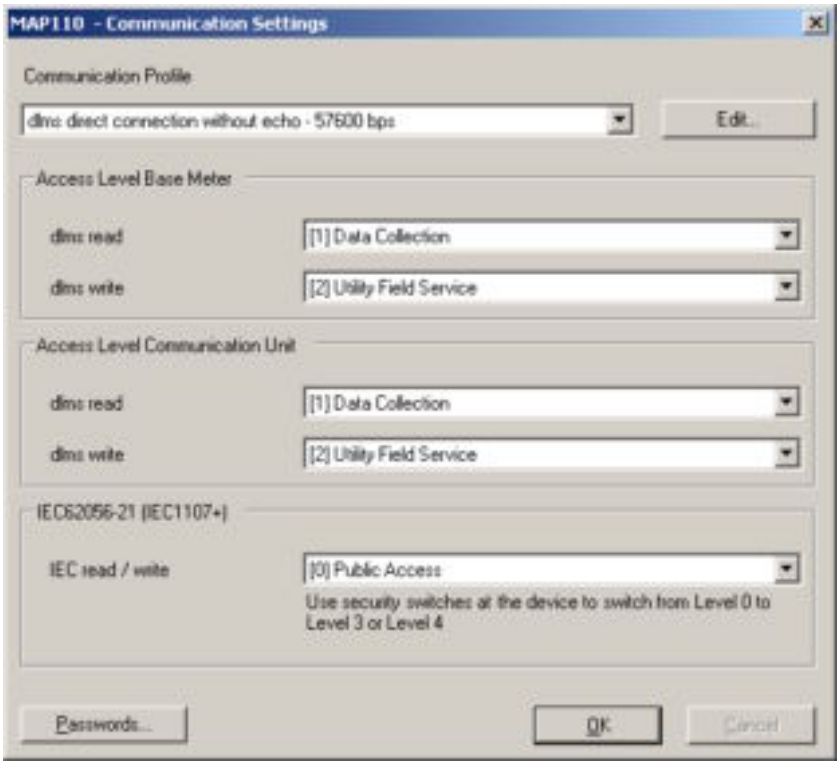


Procedure:

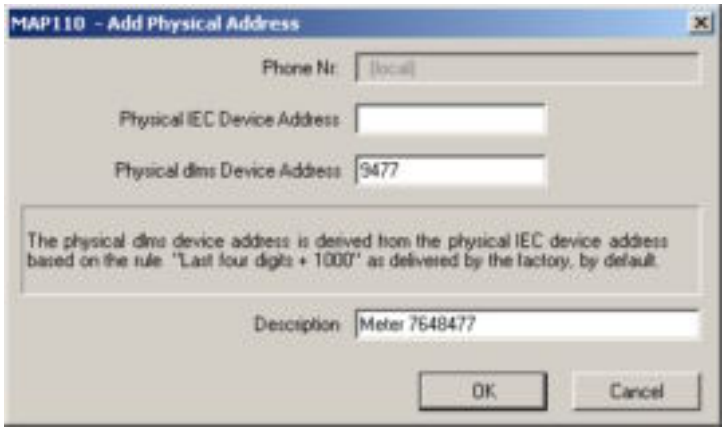
1. Click on  in the tool bar or select **Communication Settings...** from the **Extras** menu.
   The "MAP110 - Communication Settings" window appears showing the settings last used.
2. Select or create a communication profile with the following settings (for procedure see chapter 6.2.1 "Communication Profiles"):
   - Selection box "Interface": serial interface, to which the connection cable to the RS232 interface of the first meter (in this example no. 76048477) is connected, e.g. COM1.
   - Selection box "Interface Type": 3-wire connection without echo.
   - Selection box "Baud Rate": Transmission rate according to the parameter setting of the communication unit in the meter, e.g. 57600.
   - Selection box "Start Protocol": According to interface type or HDLC, since access is to take place via the dlms protocol.



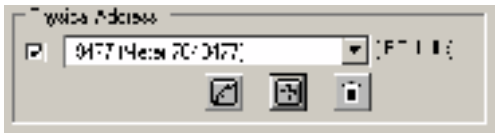
3. Select the required access levels for the intended activity in the relevant selection boxes of the "MAP110 - Communication Settings" window, e.g. [1] Data Collection for read commands and [2] Utility Field Service for write commands.



4. In the "MAP110 - Communication Settings" window click on **OK**.
   The communication settings are applied and the "Communication Settings" window disappears again.
5. Select the meter type "dlms meters" in the "Select Meter Type" selection box.
6. Activate the check box in the "Physical Address" area.
   Since a multiple connection is to be made, it must be possible to specify the device address of the desired meter.
7. If the physical address of the desired meter for multiple connection is already recorded, continuation can be made directly from point 13.
8. Click in the "Physical Address" area on  to enter the device address of the meter.
   The "MAP110 - Add Physical Address" window appears.
9. Enter the HDLC device address of the desired meter in the "Physical dlms Device Address" entry box, since the dlms protocol is to be used. This is calculated from the last 4 digits of the serial number plus 1000, e.g. 9477 for the meter with the serial number 76048477 (see also chapter 6.2.3 "Addressing Meters").
10. Enter a clear designation of the meter in the "Description" entry box.



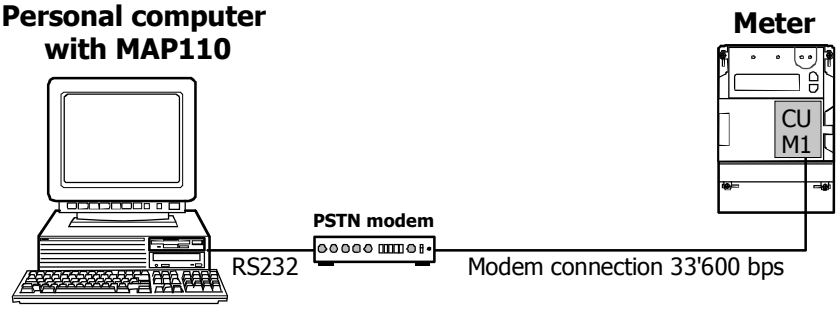
11. Click on **OK**.
    The device address added is displayed in the "Physical Address" selection box.
12. The remaining device addresses for multiple connection should be entered in the same way (points 8 to 11).
13. Select the entry with the device address of the desired meter in the "Physical Address" selection box.



14. Select the required command in the command tree.
    The command is executed.
15. If it is desired to communicate with another meter in the multiple connection, select its address while connection continues in the "Physical Address" selection box and then select the desired command in the command tree (the multiple connection must not be interrupted and re-connected for the changeover).

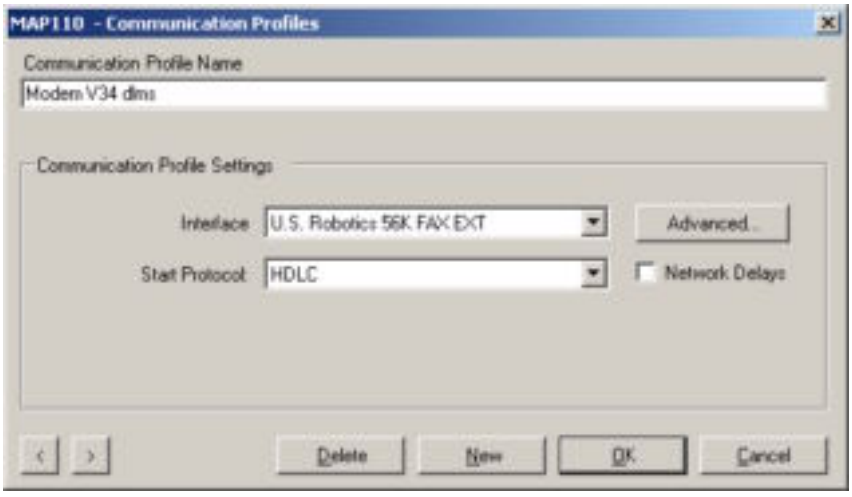
6.3.4 Remote Point-to-Point Connection via V34b PSTN Modem

This example shows how a point-to-point connection is made for remote communication with a single meter fitted with a CU-M1/V34b communication unit via a V34b PSTN modem. dlms is used as communication protocol.

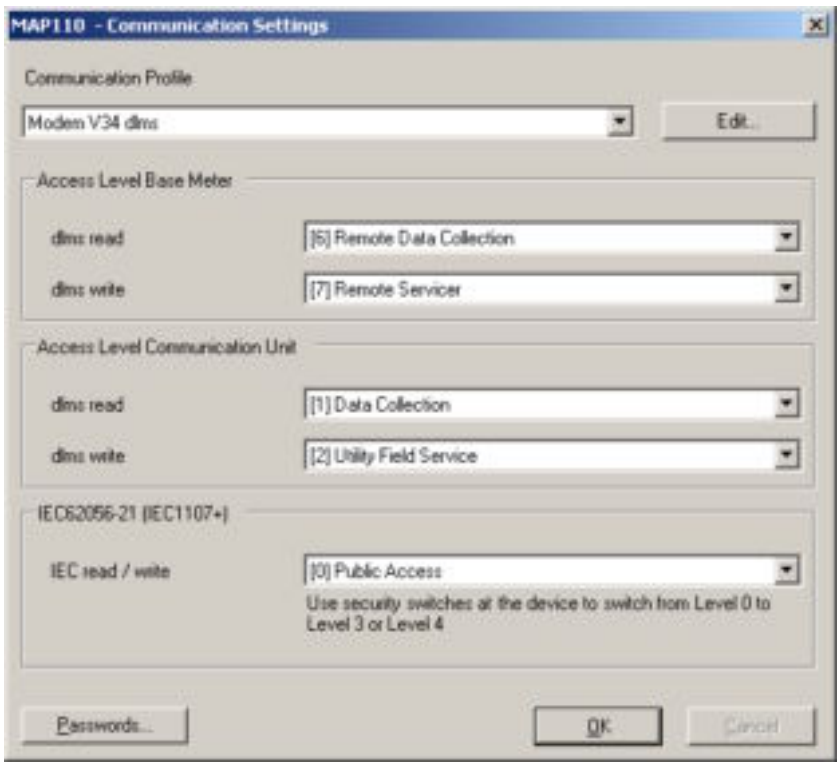


Procedure:

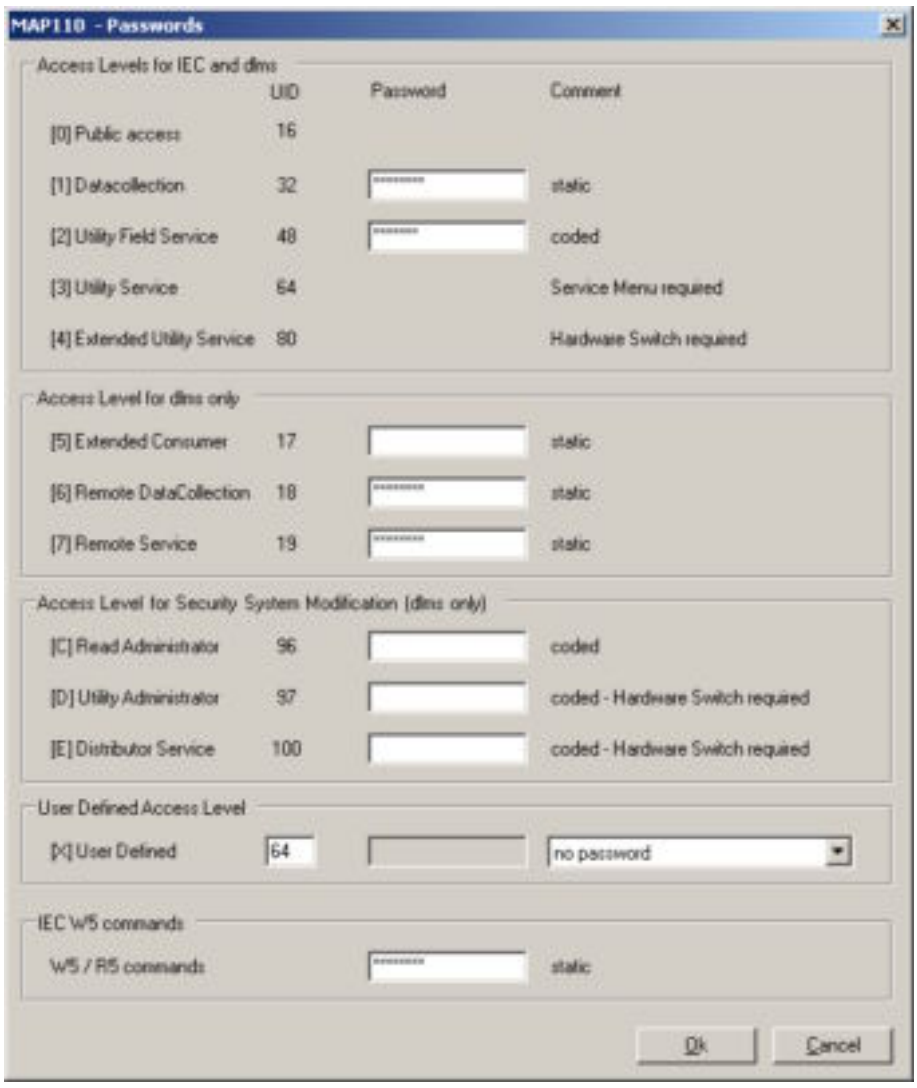
1. Click on  in the tool bar or select **Communication Settings...** from the **Extras** menu.
   The "MAP110 - Communication Settings" window appears showing the settings last used.
2. Select or create a communication profile with the following settings (for procedure see chapter 6.2.1 "Communication Profiles"):
   - Selection box "Interface": any available V34b PSTN modem.
   - Selection box "Start Protocol": HDLC, since access is to be made via the dlms protocol.



3. Select the required access levels for the intended activity in the relevant selection boxes of the "MAP110 - Communication Settings" window, e.g. [6] Remote Data Collection for read commands and [7] Remote Service for write commands. If the access level to be used is not known, refer to chapter 10.4 "Access Levels and their Application".

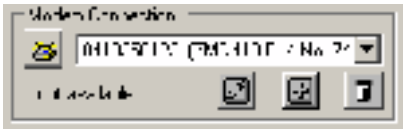


4. Click on **Passwords...**.
   The "MAP110 - Passwords" window appears.



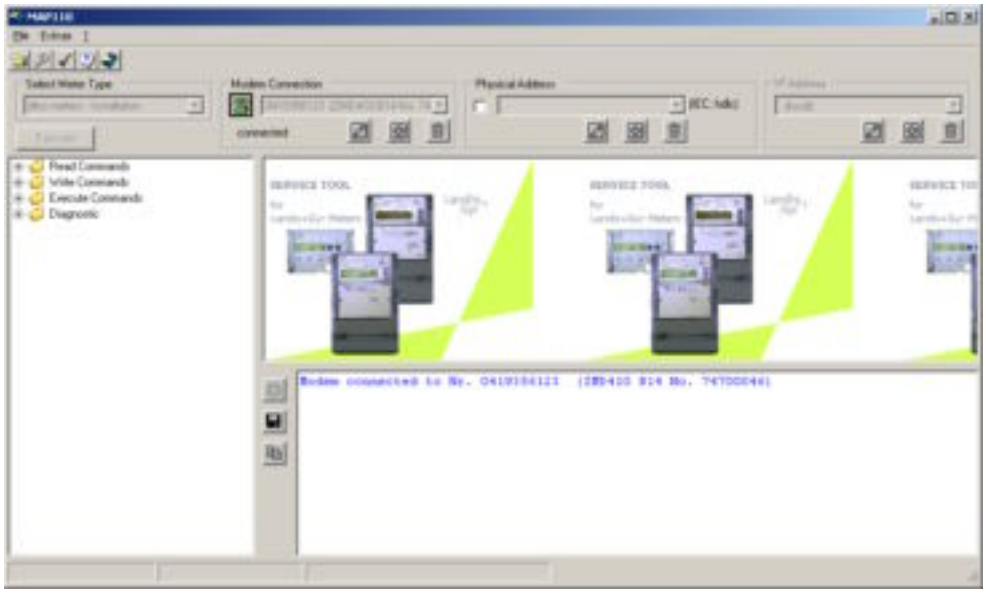
5. Enter the valid passwords for the access levels used.
   For test installations at Landis+Gyr "66666666" is programmed as default password for access level 6 and "77777777" for access level 7.
6. In the "MAP110 - Passwords" window click on **OK**.
   The passwords entered are stored and the "MAP110 - Passwords" window disappears again.
7. In the "MAP110 - Communication Settings" window click on **OK**.
   The communication settings are applied and the "Communication Settings" window disappears again.
8. Select the meter type "dlms meters" in the "Select Meter Type" selection box.
9. If the call number of the meter modem is already entered, continue directly from point 13.
10. Click on  in the "Modem Connection" area to enter the call number of the meter modem.
    The "MAP110 - Add Modem Connection" window appears.
11. Enter the telephone number of the modem to be called in the "Modem Connection" entry box and in the "Description" entry box for example a clear designation of the meter location.

12. Click on **OK**.
    The call number added is displayed in the "Modem Connection" selection box.
13. Select the entry with the call number of the meter modem in the "Modem Connection" selection box.
    If the call number has just been entered, it is already selected.



14. Click on  in the "Modem Connection" area to make connection to the modem.
    The "MAP110 - Dialing..." window is displayed while making the connection.

When the connection is made, it is indicated in the log area and the command tree is released.

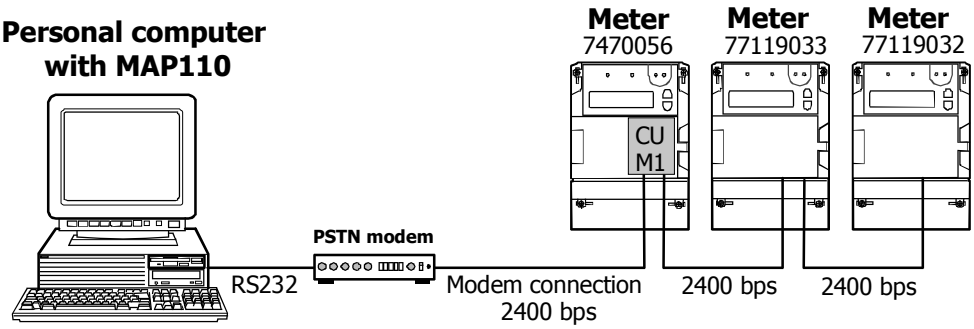


15. Select the required command in the command tree.
    The command is executed.

16. Click on  in the "Modem Connection" area to conclude the modem connection.

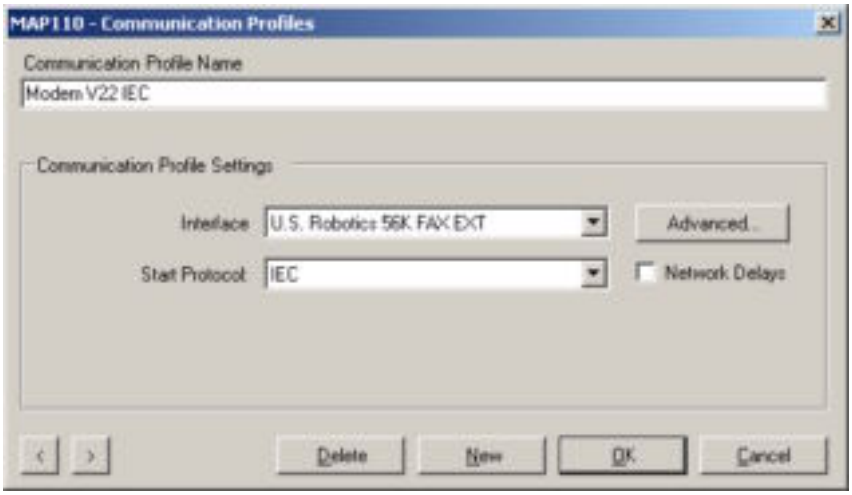
6.3.5 Remote Multiple Connection via V22b PSTN Modem

This example shows how a multiple connection is made for remote reading of several interconnected meters via a V22b PSTN modem. IEC is used as communication protocol. In the layout diagram below the meter numbers are given for addressing.

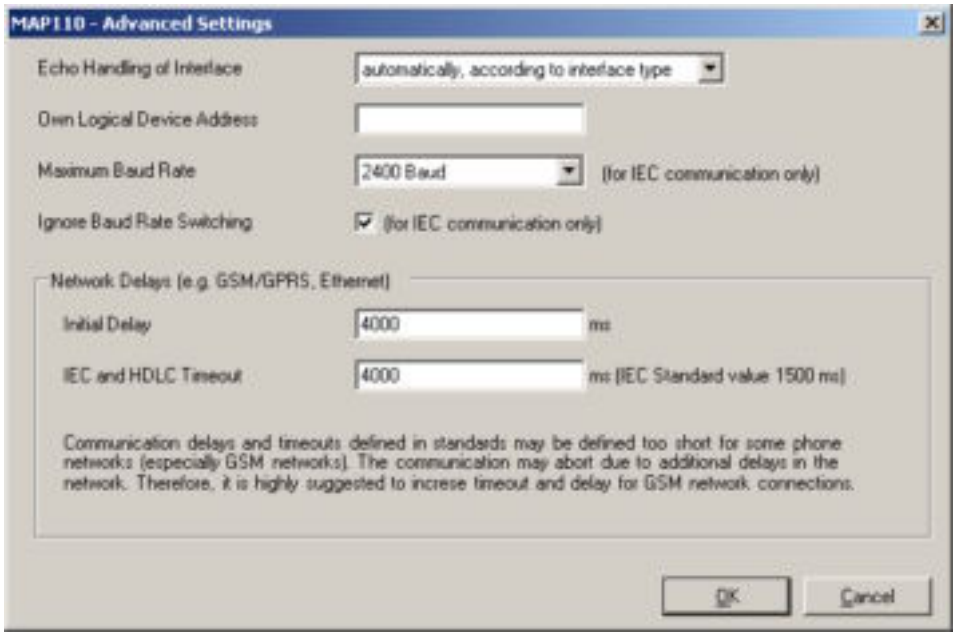


Procedure:

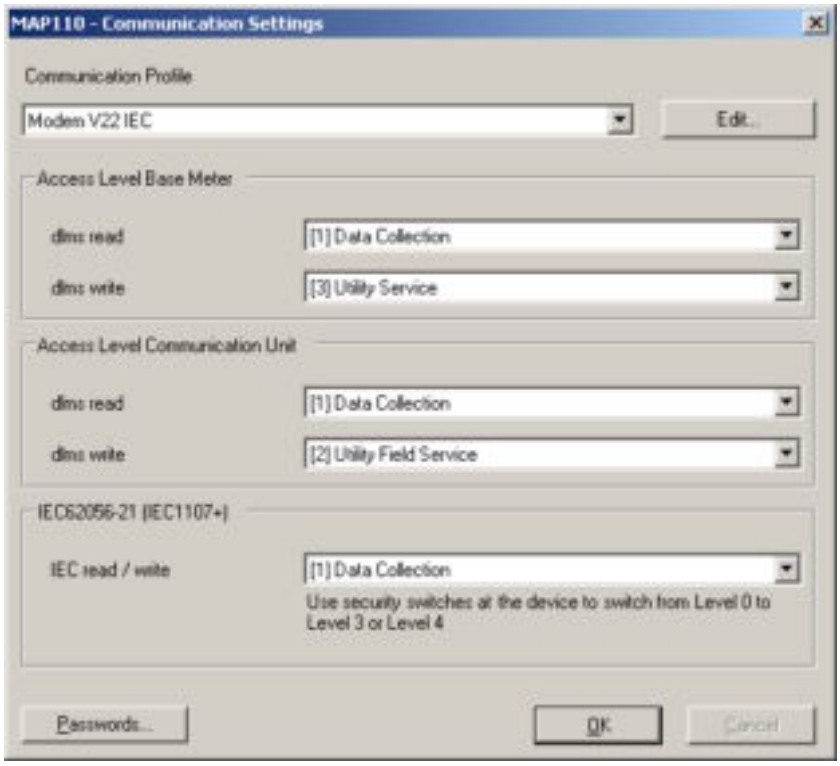
1. Click on  in the tool bar or select **Communication Settings...** from the **Extras** menu.
   The "MAP110 - Communication Settings" window appears showing the settings last used.
2. Select or create a communication profile with the following settings (for procedure see chapter 6.2.1 "Communication Profiles"):
   - Selection box "Interface": any available V22b PSTN Modem.
   - Selection box "Start Protocol": IEC, since access is to take place via the IEC protocol.



3. Click on **Advanced...**.
   The "MAP110 - Advanced Settings" window appears.

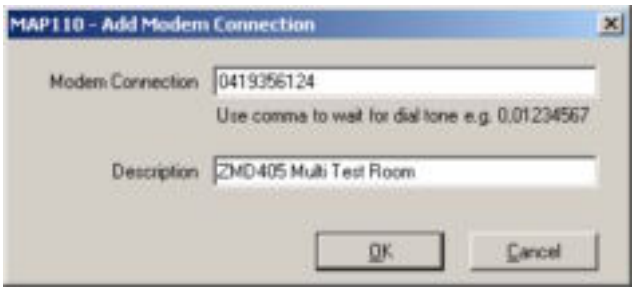


4. Select the item "2400 Baud" in the "Maximum Baud Rate" box.
   This is necessary because a V22bis modem is used on the meter side and the multiple connection is also set to 2400 bps.
5. Activate the check box "Ignore Baud Rate Switching".
6. Click on **OK** in the "MAP110 - Advanced Settings" window and in the "Communication Profiles" window.
   The windows disappear again.
7. Select the required access level for the planned action, e.g. [1] Data Collection in the "IEC62056-21" selection box of the "MAP110 - Communication Settings" window.



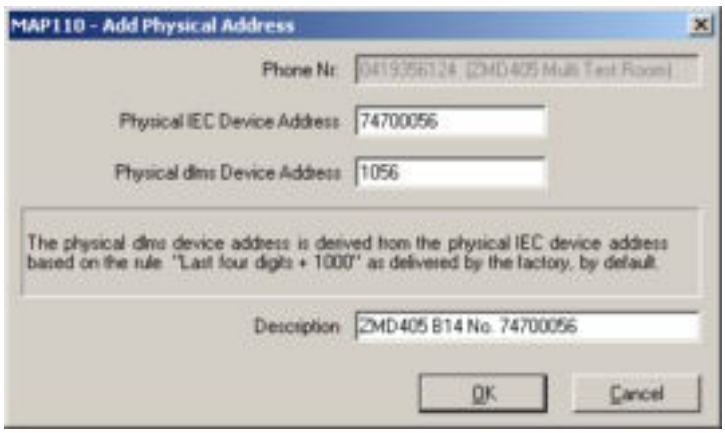
8. In the "MAP110 - Communication Settings" window click on **OK**.
   The communication settings are applied and the "MAP110 - Communication Settings" window disappears again.

9. Select the meter type "IEC meters" in the "Select Meter Type" selection box.
10. If the call number of the meter modem is already entered, continue directly from point 14.
11. Click on  in the "Modem Connection" area to enter the call number of the meter modem.
    The "MAP110 - Add Modem Connection" window appears.
12. Enter the telephone number of the modem to be called in the "Modem Connection" entry box and in the "Description" entry box for example a clear designation of the meter location.

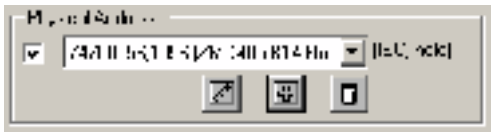


13. Click on **OK**.
    The call number added is displayed in the "Modem Connection" selection box.
14. Select the entry with the call number of the meter modem in the "Modem Connection" selection box.
    If the call number has just been entered, it is already selected.

15. Activate the check box in the "Physical Address" area.
    Since a multiple connection is to be made, it must be possible to specify the device address of the desired meter.
16. If the physical address of the desired meter for multiple connection is already recorded, continuation can be made directly from point 21.
17. Click in the "Physical Address" area on  to enter the device address of the meter.
    The "MAP110 - Physical Address" window appears.
18. Enter the IEC device address of the desired meter in the "Physical IEC Device Address" entry box. This corresponds to the meter serial number (see also chapter 6.2.3 "Addressing Meters").
    The dlms device address is calculated automatically and displayed in the "Physical dlms Device Address" entry box.
19. Enter a clear designation of the meter in the "Description" entry box.

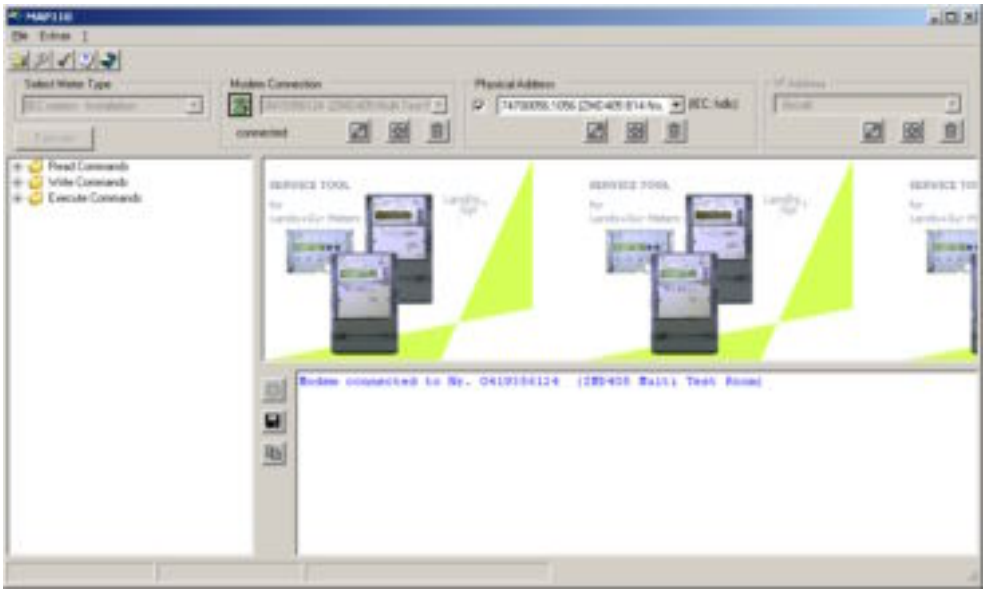


20. Click on **OK**.
    The device address added is displayed in the "Physical Address" selection box. It is assigned to the selected modem connection.
21. The remaining device addresses for multiple connection should be entered in the same way (points 17 to 20).
22. Select the entry with the device address of the desired meter in the "Physical Address" selection box.



23. Click on  in the "Modem Connection" area to make connection to the modem.
    The "MAP110 - Dialing..." window is displayed while making the connection.

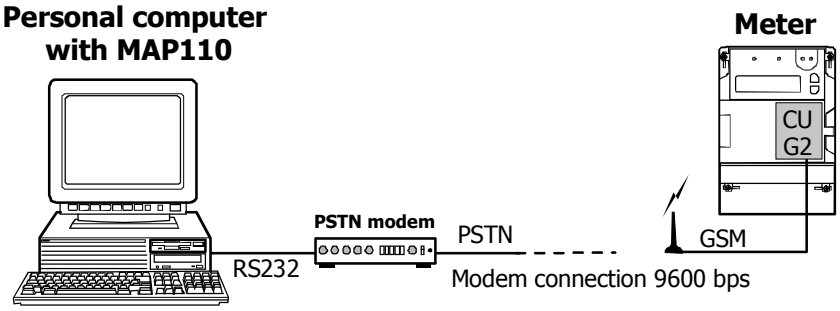
When the connection is made, it is indicated in the log area and the command tree is released.



24. Select the required command in the command tree.
    The command is executed.
25. If it is desired to communicate with another meter in the multiple connection, select its address while connection continues in the "Physical Address" selection box and then select the desired command in the command tree (the multiple connection must not be interrupted and re-connected for the changeover).
26. Click on  in the "Modem Connection" area to conclude the modem connection.

6.3.6 Remote Point-to-Point Connection via GSM Modem

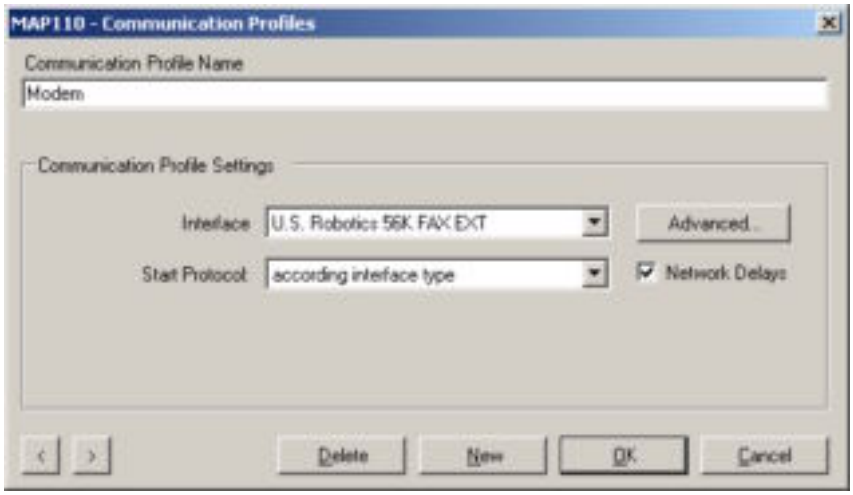
This example shows how a modem point-to-point connection is made to a meter with GSM modem (CU-G2 communication unit) in order, for example, to check the existing field strength at the meter.



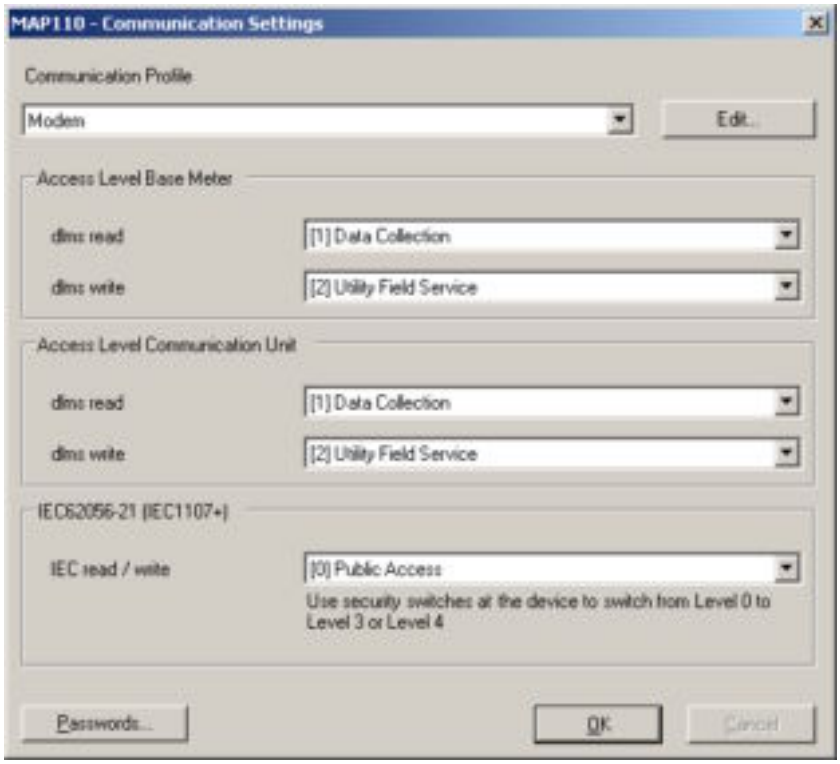
Procedure:

1. Click on  in the tool bar or select **Communication Settings...** from the **Extras** menu.
   The "MAP110 - Communication Settings" window appears showing the settings last used.
2. Select or create a communication profile with the following settings (for procedure see chapter 6.2.1 "Communication Profiles"):
   - Selection box "Interface": any available modem.

- Selection box "Start Protocol": according interface type or HDLC. Diagnostic commands are not available with the "IEC" setting.
- Check box "Network Delays" activated.
  This increases the time delays with respect to the standard value of 1500 ms to the value set under "Advanced Communication Settings" (default value = 4000 ms). Increasing the time delays prevents the occurrence of interruptions during data transmission and is urgently recommended for GSM networks.



3. Select the required access levels for the intended activity in the relevant selection boxes of the "MAP110 - Communication Settings" window, e.g. [0] Public Access.



4. Select the meter type "dlms meters" in the "Select Meter Type" selection box.
   Diagnostic commands are not available with the meter type setting "IEC meters".

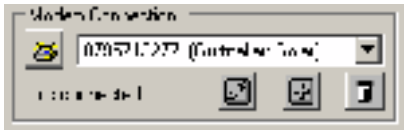
5. If the call number of the meter modem is already entered, continue directly from point 9.

6. Click on  in the "Modem Connection" area to enter the call number of the meter modem.
   The "MAP110 - Add Modem Connection" window appears.

7. Enter the telephone number of the modem to be called in the "Modem Connection" entry box and in the "Description" entry box for example a clear designation of the meter location.

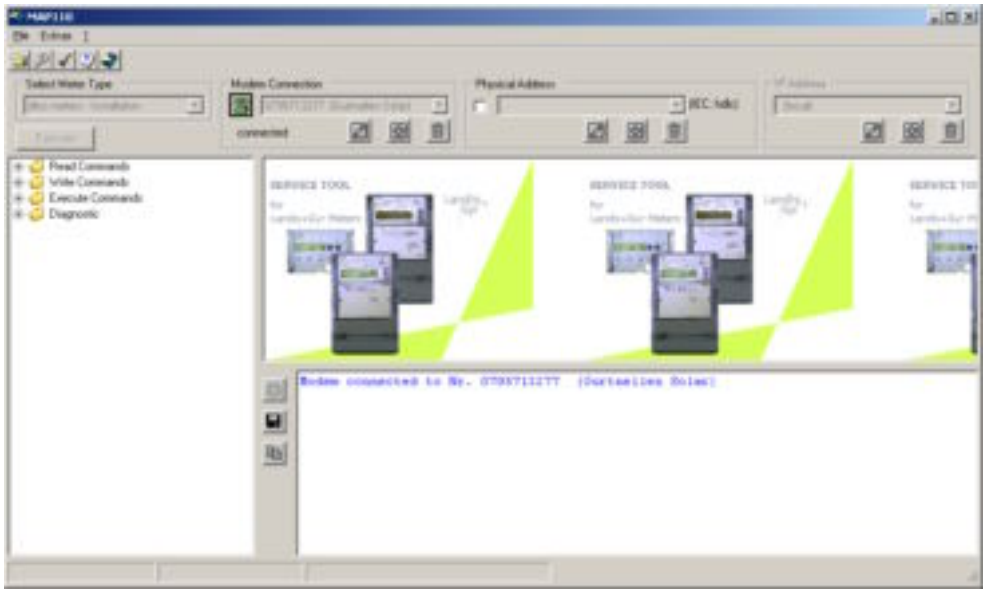
8. Click on **OK**.
   The call number added is displayed in the "Modem Connection" selection box.

9. Select the entry with the call number of the meter modem in the "Modem Connection" selection box.
   If the call number has just been entered, it is already selected.

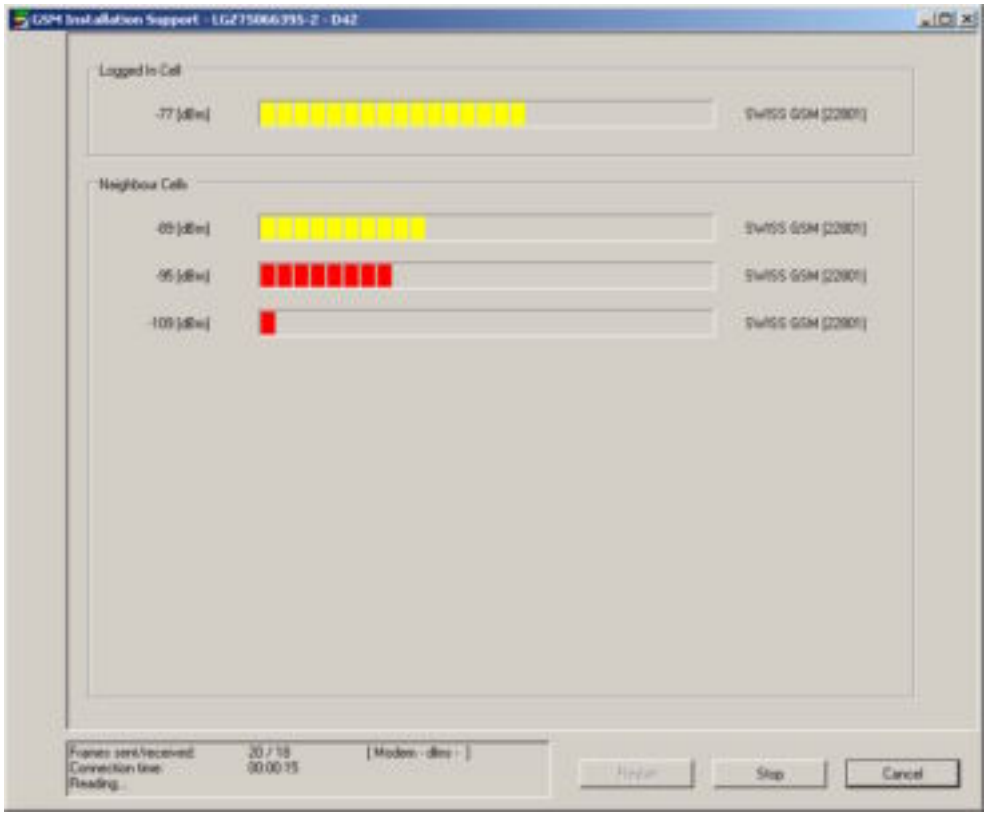


10. Click on  in the "Modem Connection" area to make connection to the modem.
    The "MAP110 - Dialing…" window is displayed while making the connection.

When the connection is made, it is indicated in the log area and the command tree is released.



11. Select the "GSM Installation Support" command in the command tree under "Diagnostic".
    The field strength at the location of the meter is measured for the cell logged in and for the neighbouring cells available and displayed as bar and value.



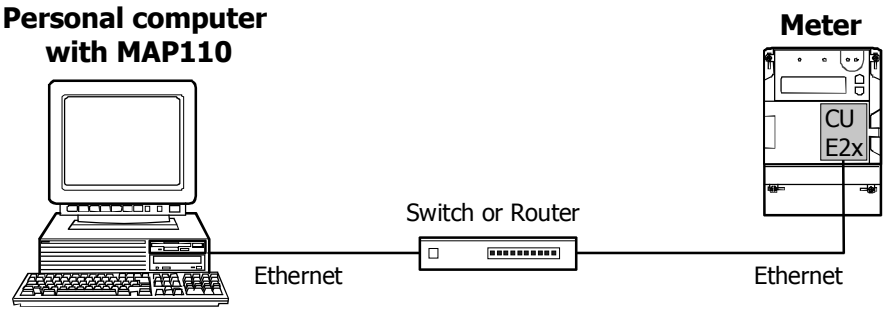
The field strength measurement is not continuously updated with a remote connection via GSM channel, but the values immediately after making the connection are displayed.

12. Click on **Stop**.
    Measurement is stopped, but can be repeated by clicking **Restart**.

13. Click on  in the "Modem Connection" area to conclude the modem connection.

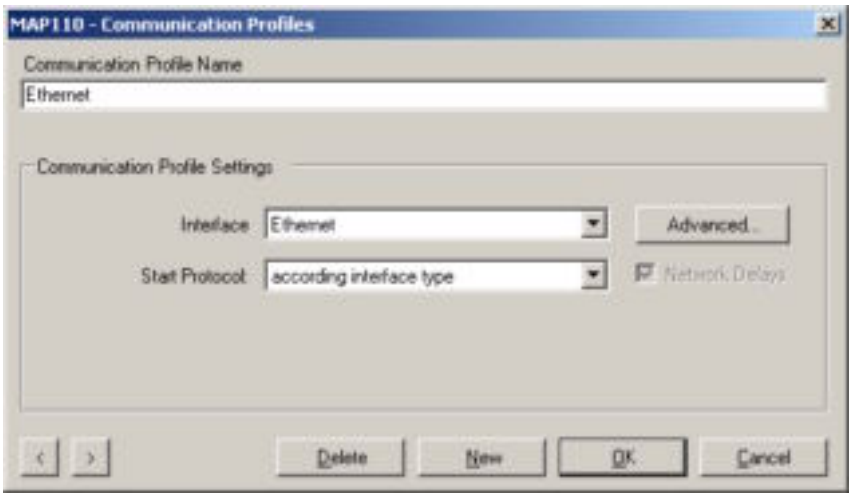
6.3.7 Local Point-to-Point Connection via Ethernet

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

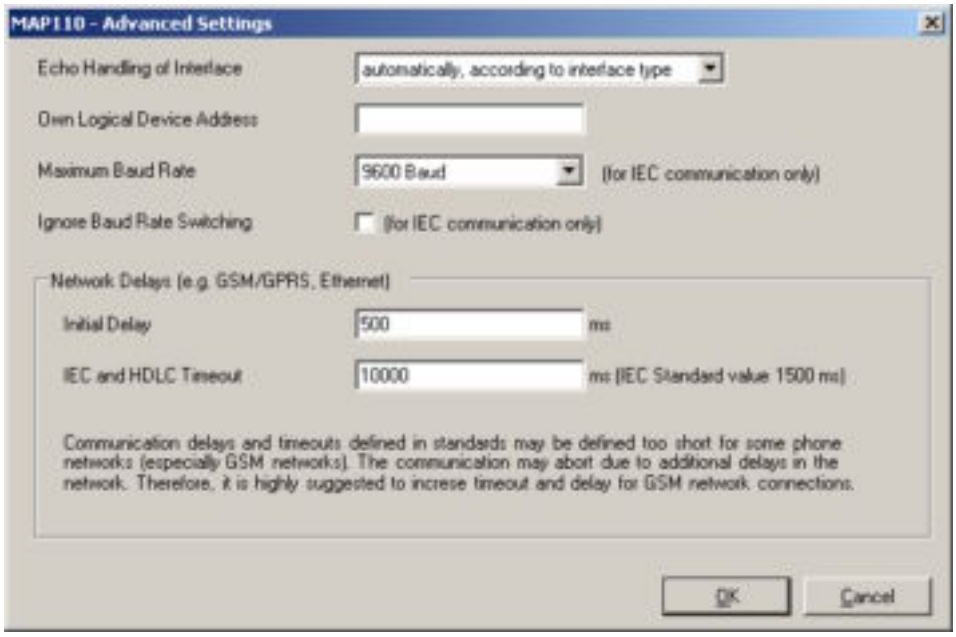


Procedure:

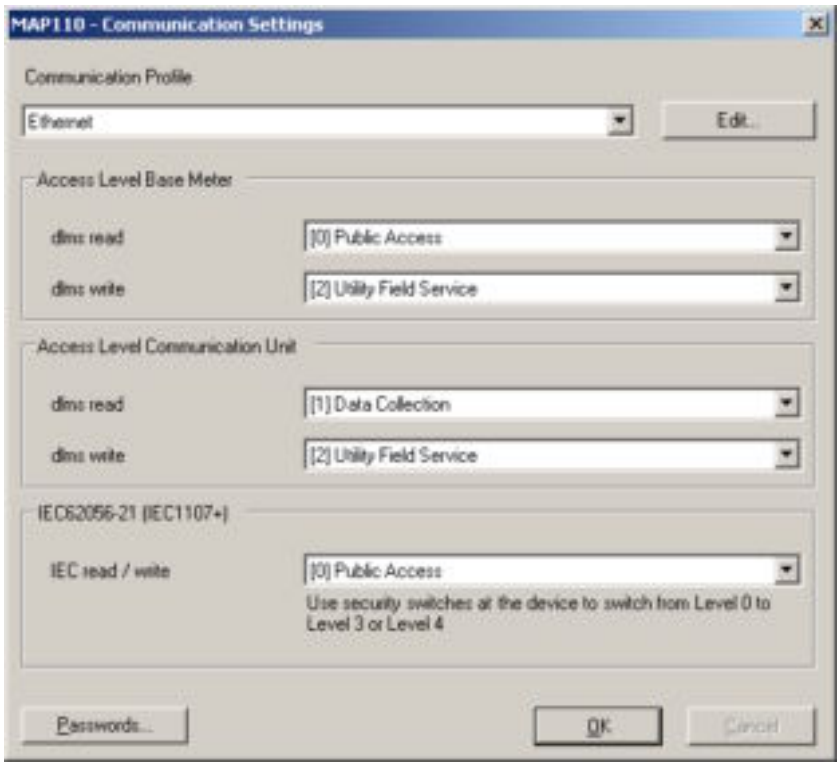
1. Click on  in the tool bar or select **Communication Settings...** from the **Extras** menu
   The "MAP110 - Communication Settings" window appears showing the settings last used.
2. Select or create a communication profile with the following settings (for procedure see chapter 6.2.1 "Communication Profiles"):
   - Selection box "Interface": Ethernet
   - Selection box "Start Protocol": According interface type.
   - Check box "Network Delays" activated.
     This setting occurs automatically if Ethernet is selected as interface. This increases the time delays with respect to the standard value of 1500 ms to the value set under "Advanced Communication Settings" (default value = 4000 ms). Increasing the time delays prevents the occurrence of interruptions during data transmission.



3. Click on **Advanced...**.
   The "MAP110 - Advanced Settings" window appears.

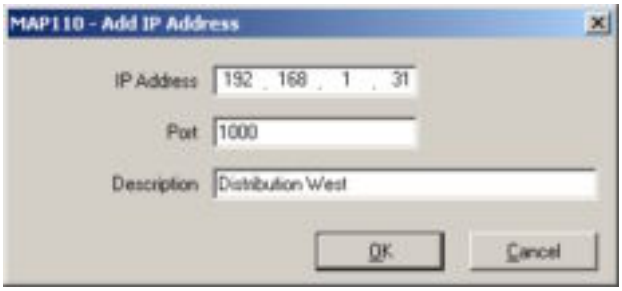


4. Enter an "Initial Delay" of 500 ms and an "IEC and HDLC Timeout" of 10000 ms.
5. Click on **OK** in the "MAP110 - Advanced Settings" window and in the "Communication Profiles" window.
   The windows disappear again.
6. Select the required access levels for the intended activity in the relevant selection boxes of the "MAP110 - Communication Settings" window.



7. Click on **OK**.
   The communication settings are applied and the "MAP110 - Communication Settings" window disappears again.
8. If the IP address and port number of the meter is already recorded, continuation can be made directly from point 12.

9. Click in the "IP Address" area on  to enter the IP address and port number of the meter.
   The "MAP110 - Add IP Address" window appears.
10. Enter the IP address and the port number of the desired meter in the corresponding entry boxes and for example a clear designation of the meter location in the "Description" entry box .

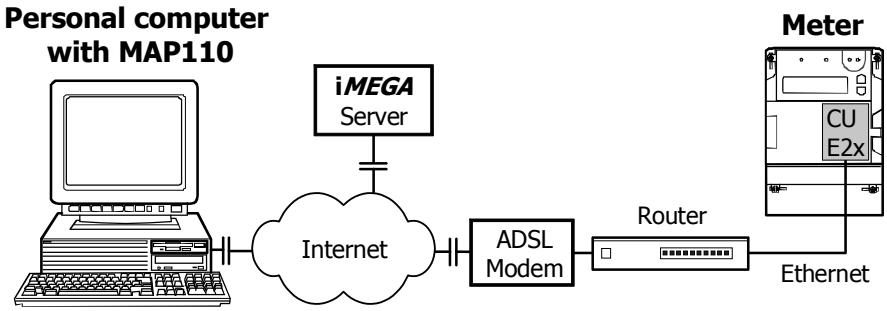


11. Click on **OK**.
    The IP address and port number added are displayed in the "IP Address" selection box.
12. Select the entry with the IP address and port number of the meter in the "IP Address" selection box.
    If the IP address and port number have just been entered, it is already selected.

13. Select the meter type "dlms meters" or "IEC meters" in the "Select Meter Type" selection box corresponding to the characteristics of the meter connected.
14. Select the required command in the command tree.
    Communication is started and the command executed.

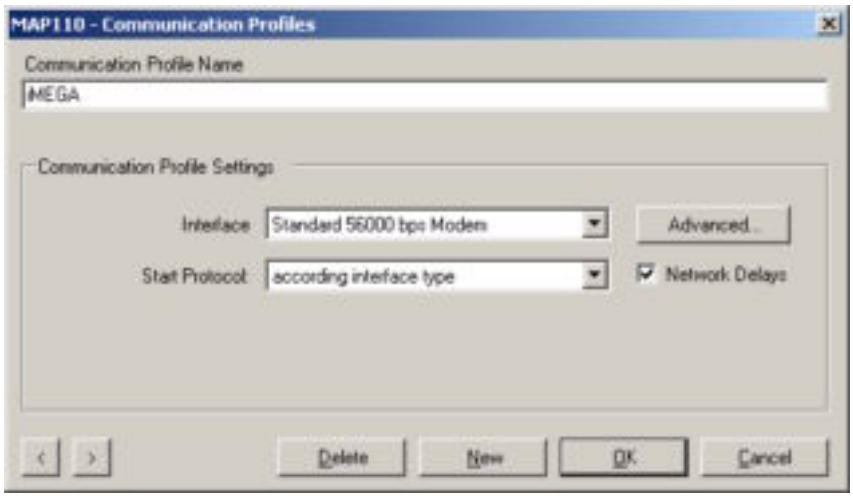
6.3.8 Remote Point-to-Point Connection via the Internet

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

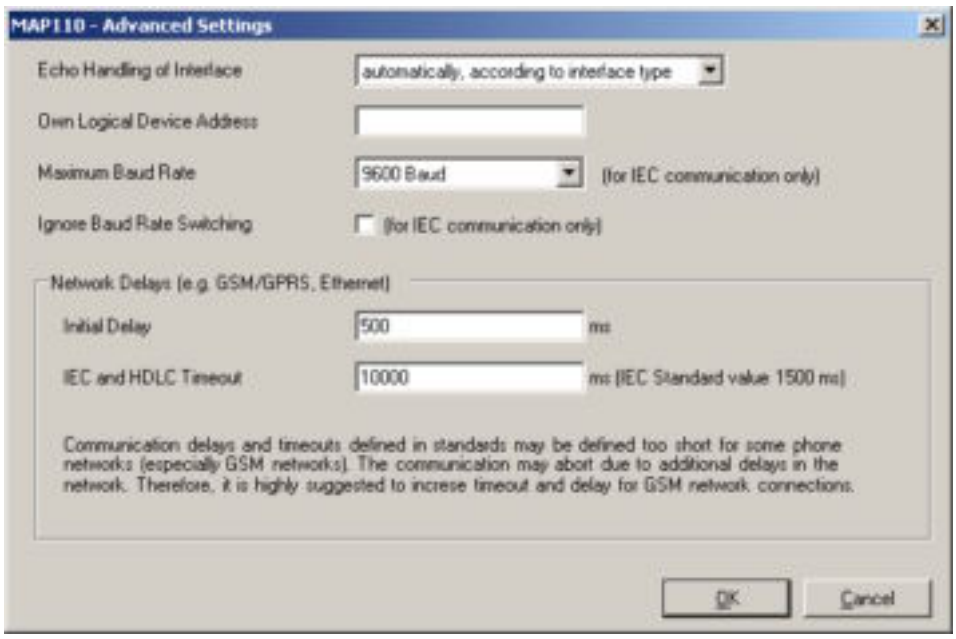


Procedure:

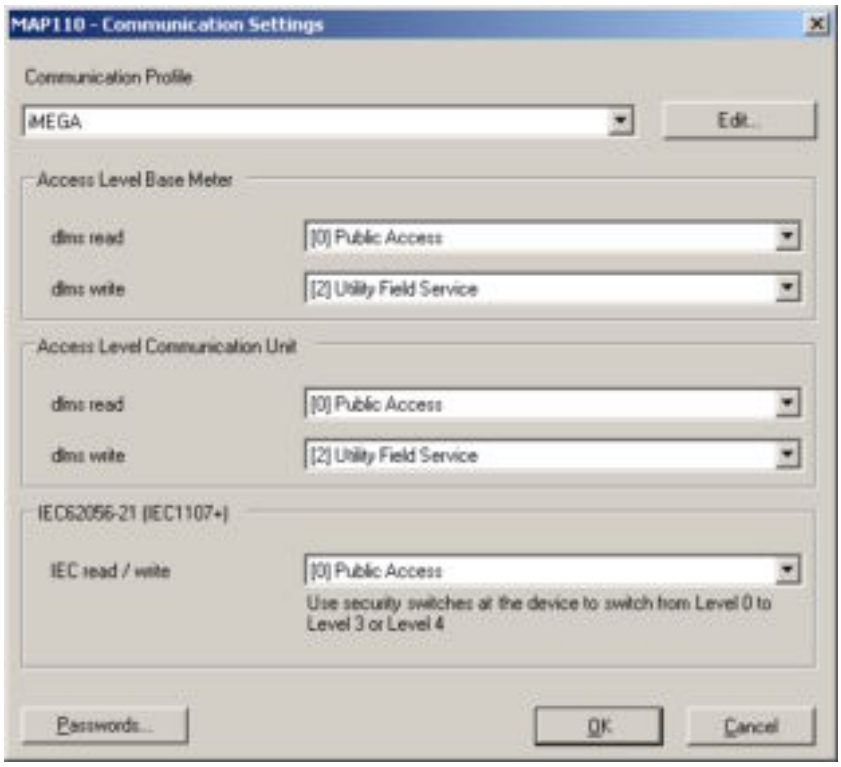
1. Click on  in the tool bar or select **Communication Settings...** from the **Extras** menu
   The "MAP110 - Communication Settings" window appears showing the settings last used.
2. Select or create a communication profile with the following settings (for procedure see chapter 6.2.1 "Communication Profiles"):
   - Selection box "Interface": Modem, which has been defined for the virtual COM port to the iMEGA server
   - Selection box "Start Protocol": According interface type.
   - Check box "Network Delays" activated.
     This increases the time delays with respect to the standard value of 1500 ms to the value set under "Advanced Communication Settings" (default value = 4000 ms). Increasing the time delays prevents the occurrence of interruptions during data transmission.



3. Click on **Advanced...**.
   The "MAP110 - Advanced Settings" window appears.

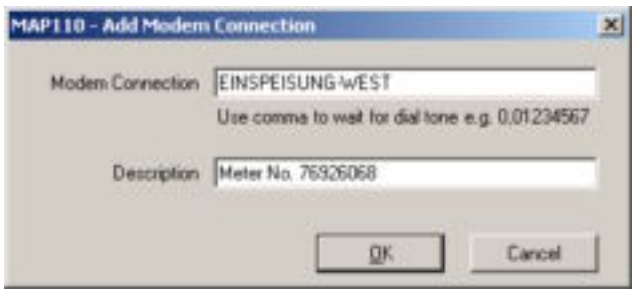


4. Enter an "Initial Delay" of 500 ms and an "IEC and HDLC Timeout" of 10000 ms.
5. Click on **OK** in the "MAP110 - Advanced Settings" window and in the "Communication Profiles" window.
   The windows disappear again.
6. Select the required access levels for the intended activity in the relevant selection boxes of the "MAP110 - Communication Settings" window.

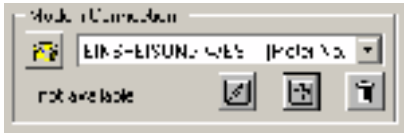


7. Click on **OK**.
   The communication settings are applied and the "MAP110 - Communication Settings" window disappears again.
8. If the network ID of the meter is already recorded, continuation can be made directly from point 14.

9. Click on  in the "Modem Connection" area to enter the call number of the meter modem.
   The "MAP110 - Add Modem Connection" window appears.
10. Enter the network ID of the meter in the "Modem Connection" entry box and in the "Description" entry box for example a clear designation of the meter location.

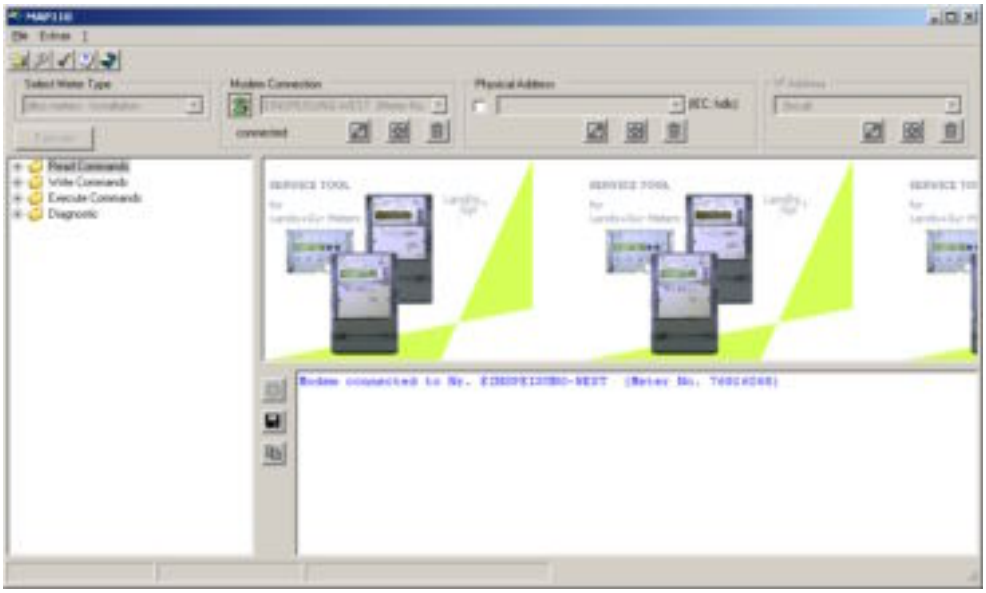


11. Click on **OK**.
    The network ID added is displayed in the "Modem Connection" selection box.
12. Select the entry with the network ID of the meter in the "Modem Connection" selection box (this is treated for the call via the virtual COM port like a telephone number).
    If the network ID has just been entered, it is already selected.



13. Select the meter type "dlms meters" or "IEC meters" in the "Select Meter Type" selection box corresponding to the characteristics of the meter connected.
14. Click on  in the "Modem Connection" area to make connection to the iMEGA server.
    The "MAP110 - Dialing..." window is displayed while making the connection.

When the connection is made, it is indicated in the log area and the command tree is released.



15. Select the required command in the command tree.
    Communication is started and the command executed.
16. Click on  in the "Modem Connection" area to conclude the connection to iMEGA server.

6.4 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
- **User manuals** for the various communication units
- **Functional description** of communication units
- Detailed **application notes** for numerous reference applications with various communication units 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 chapter 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 chapter 5.8 "Command Tree", Command execution" section.

7.1 Read Commands

Chapter 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:

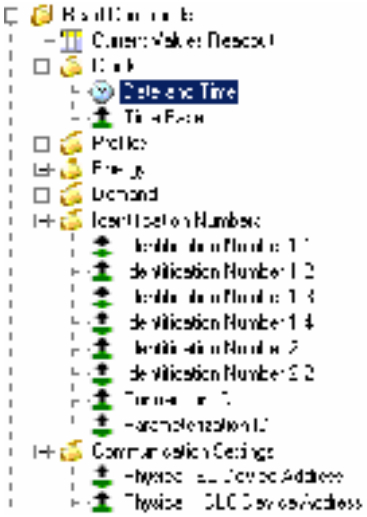
- Simple read commands for parameters and values
- Read commands for current meter data
- Read commands for event logs
- Read commands for load profiles

Other read commands can be used in a similar way.

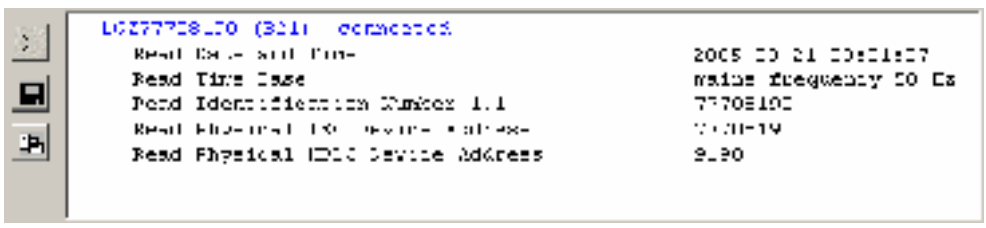
7.1.1 Simple Read Commands

Simple read commands read out an individual parameter or value from the meter 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 trace window (command left, result right):



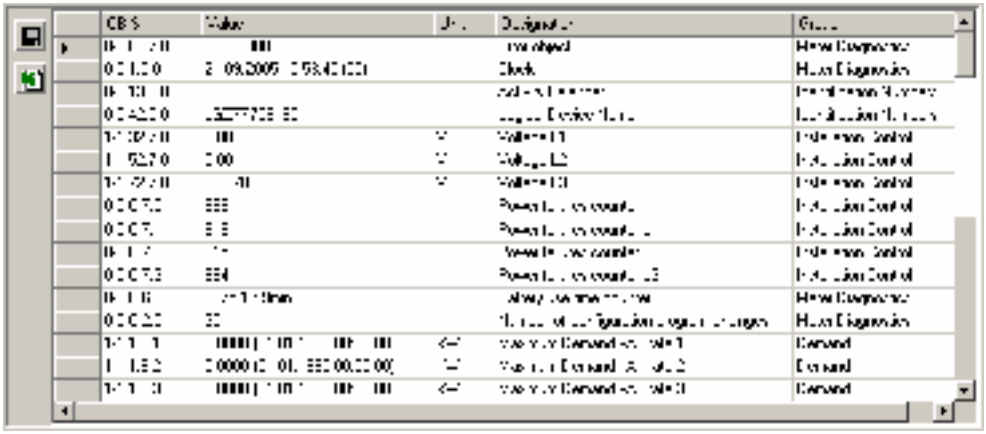
7.1.2 Read Commands for Current Meter Data

For read commands for current meter data a table of values and parameters is read out from the meter and displayed in the display window.

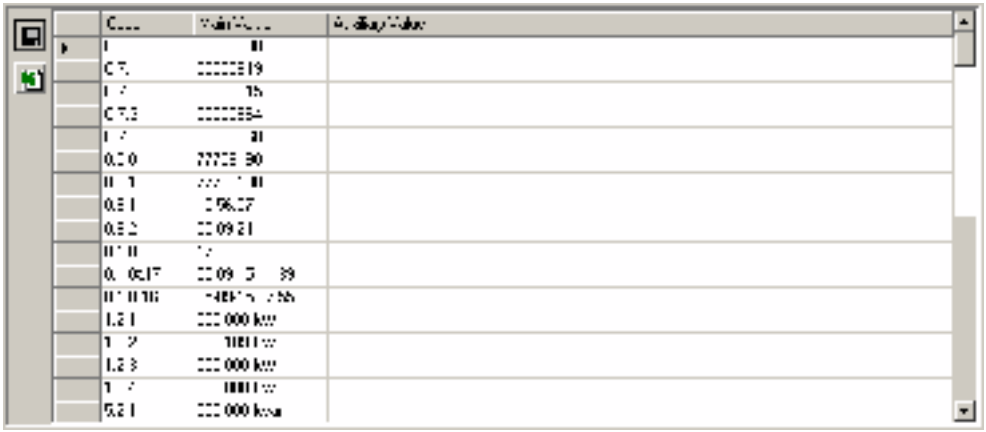
To execute, select the "Current Values Readout" read command (dlms meters) or "IEC Data Readout" (IEC meters) in the command tree.

The table read out is shown in the display 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 chapter 11 "OBIS Identification Codes"), the display value, the unit, exact designation and the group.



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).



The table can be saved as XML or text file for further processing or exported directly to the Excel table calculation program (see chapter 5.9 "Display Window").

7.1.3 Read Commands for Event Logs

With read commands for event logs a table of events occurring is read from the meter and shown in the display window.

For execution, select the "Event Log" (dlms meters) or "Event Log R5" (IEC meters) read command in the command tree.

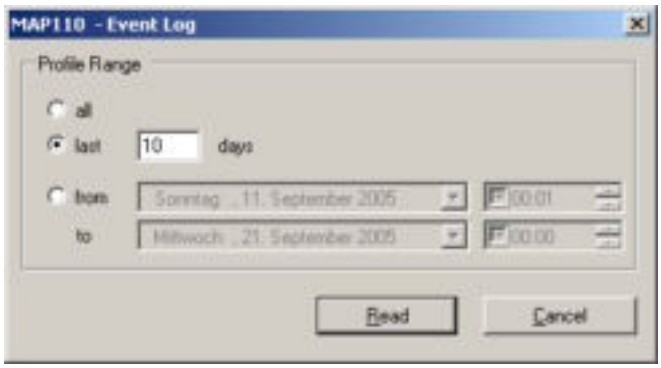
The profile range to be read out can be specified in a dialogue window:

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

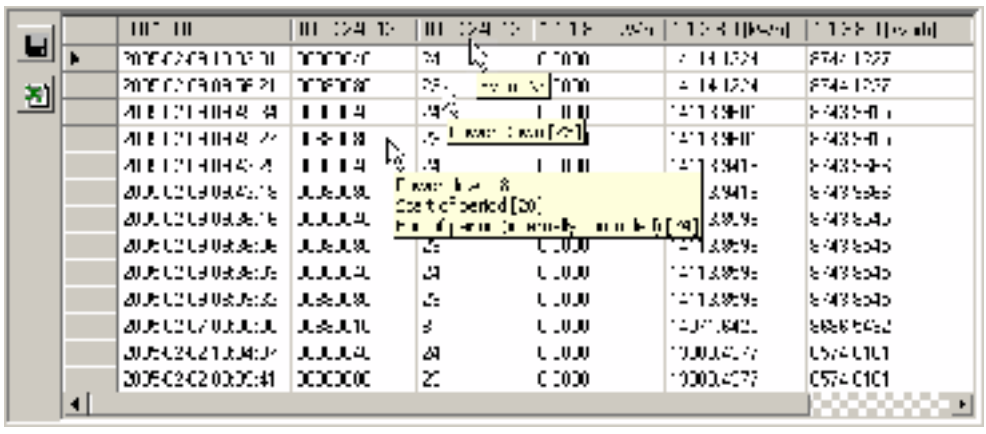
Note

Shortening readout time by data selection

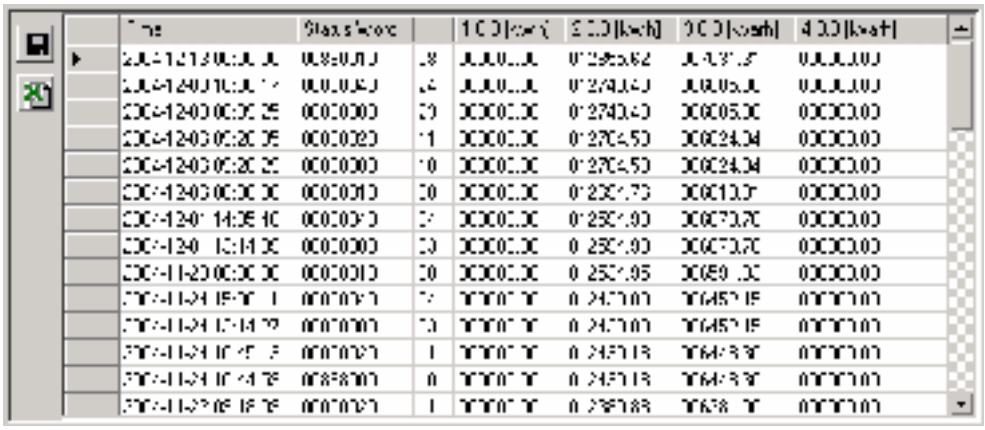
It is highly recommended to perform a data selection before readout, since readout of the entire event log can take a considerable time.



The event log data read out are shown as a table in the display window. With readout under dlms the table contains the date and time, EDIS status word, event number and register statuses for every event. An explanatory text is displayed by placing the mouse pointer on a column heading or a cell. In the case of a coded EDIS status word, this is directly decoded and all individual events are displayed (e.g. the EDIS status word 00880080 contains the individual events 8, 20 and 24).



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



The table can be saved as XML or text file for further processing or exported directly to the Excel table calculation program (see chapter 5.9 "Display Window").

Event types

The following table shows which event types can be recorded under which event number in the event log:

Event type	**Number**
Tariff registers cleared	2
Load profile memory cleared	3
Battery charge low	5
Battery voltage ok	7
Meter reset performed	8
Summer/winter changeover	9
Time/date newly set (old values)	10
Time/date newly set (new values)	11
Control inputs status changed	13
Undervoltage phase L1	17
Undervoltage phase L2	18
Undervoltage phase L3	19
Overvoltage phase L1	20
Overvoltage phase L2	21
Overvoltage phase L3	22
Voltage failure	23
Voltage return	24
Overcurrent phase L1	25
Overcurrent phase L2	26
Overcurrent phase L3	27
Overcurrent neutral	28
Power factors fallen below (4)	29 to 32

Event type	Number
Power factors exceeded (8)	33 to 40
Error during self-test (4)	45 to 48
Voltage failure phase 1	49
Voltage failure phase 2	50
Voltage failure phase 3	51
Error "Battery voltage low"	65
Error "Time/date invalid"	66
Error "Access measuring system memory"	75
Error "Time base"	76
Error "Ripple control receiver"	78
Error "Communication unit"	79
Error "Display and control panel‟	80
Error "Internal overflow in measuring system"	89
Error "Measuring system failed"	90
Error "Re-programming failed"	91
Error "Setting mode failed"	92
Error "System failed"	93
Error "Communication blocked"	94
Error "Wrong flash memory identification"	95
Error "Wrong function extensions identification"	96
Failure of an SMS message transmission to GSM modem	105
Important operating message recorded	106

EDIS status word

The following table shows which individual events are displayed under what numbers (corresponding to the bit of the status word). The status code is a 4 byte code according to EDIS whose bits indicate the current status of the meter and the network it is connected to.

The EDIS 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 1 to 16) are available. In the IEC readout only the bytes 1 and 2 will be included no matter the parameterisation.

Bit assignment in EDIS status word:

	Byte 4								Byte 3								Byte 2								Byte 1							
Bit	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

Number	Error description
1	Fatal error occurred
2	Power reserve of calendar clock exhausted (time invalid)
3	Incomplete measurement owing to integrating period too short

Number	Error description
4	Summer or winter time Depending on the parameterisation this bit is static (1 = summer, 0 = winter) or dynamic, i.e. only active during the first recording period following the change from summer to winter time and vice-versa.
5	Resetting performed
6	Time/date set (time stamp of new time)
7	Voltages returned (power up)
8	Voltages (3 phases) failed (power down)
9	not used
10	not used
11	not used
12	not used
13	not used
14	Event log completely deleted
15	Load profile memory completely deleted
16	Status word recorded before setting last time (time stamp of old time)
17	reserved
18	reserved
19	reserved
20	Integrating period started (SOI - start of interval)
21	Integrating period ended by tariff changeover (EOI - end of interval)
22	Integrating period ended prematurely (e.g. by time setting)
23	Integrating period ended normally by external control
24	Integrating period ended normally by internal control
25 to 32	reserved for future extensions

7.1.4 Read Commands for Load Profiles

With read commands for load profiles the load profile memory is read from the meter and shown in the display window.

For execution, select the "Load Profile" (dlms meters) or "Load Profile R5" (IEC meters) read command in the command tree.

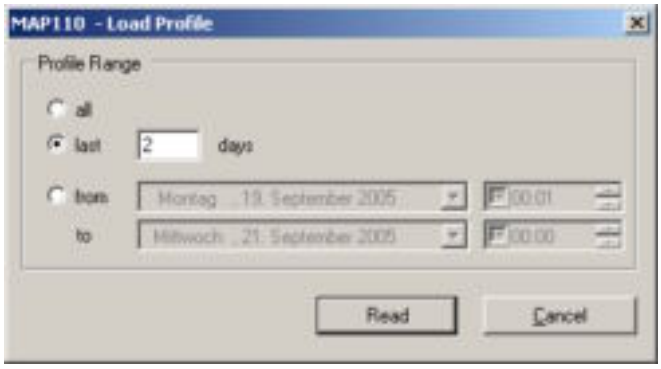
The profile range to be read out can be specified in a dialogue window:

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

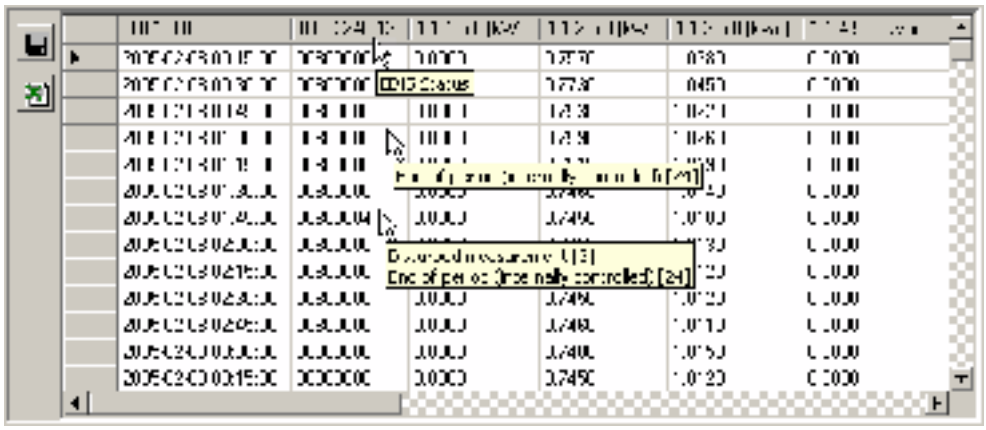
Note

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 meter has a short integrating period).



The load profile data read out are shown as a table in the display window. With readout by dlms the table contains the date and time-of-day, EDIS status word and the register statuses 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 EDIS status word (see also table in chapter 7.1.3 "Read Commands for Event Logs") are decoded directly and all individual events displayed.



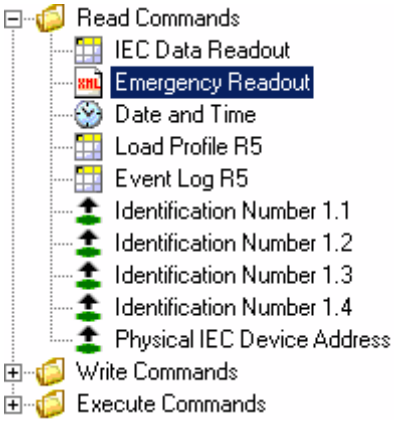
With readout according to IEC the table contains the same data for every load profile entry as for readout under dlms, although they are shown slightly differently (e.g. preceding zeros).

The table can be saved as XML or text file for further processing or exported directly to the Excel table calculation program (see chapter 5.9 "Display Window").

7.1.5 Read Command for Emergency Readout

With the read command for emergency readout the meter data can be read out into a XML file, e.g. if communication between the central station and the meter fails (for IEC meters only). This XML file can be imported later on into the meter2cash automatic meter 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
- meter identification automatically by OBIS code contained in the billing data or manually
- working folder, where the XML file shall be stored

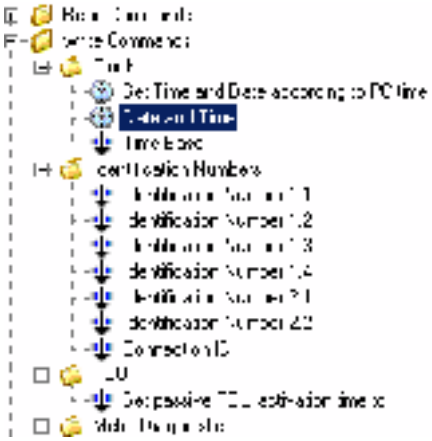
After clicking **Read** the selected data will be stored into a XML file in the working folder specified.

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

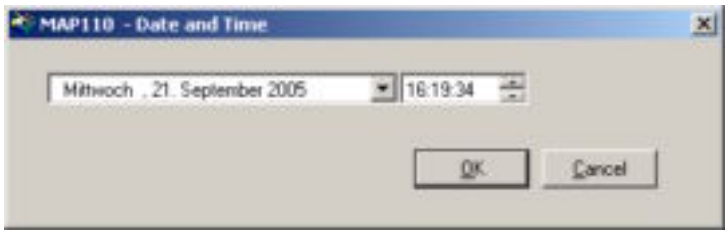
7.2 Write Commands

Chapter 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 .

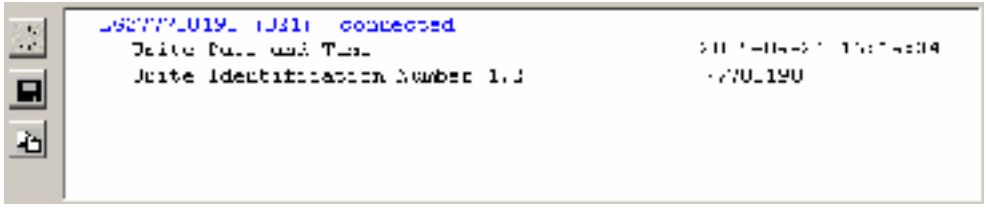


With write commands the current parameter or value is always read out first from the meter and displayed in a dialogue window for modification, e.g. for setting time and date:



or for writing an identification number:

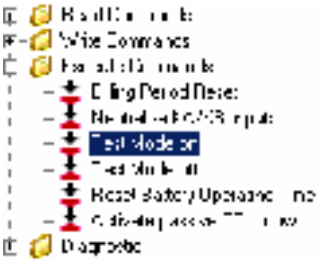
Modify the data displayed and then click on **Ok**. The modified data are written in the meter and recorded in the trace window (command left, value right):



7.3 Execute Commands

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

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



The execute command is transmitted to the meter and executed there. The commands executed are recorded in the trace window:

7.4 Diagnostic Commands

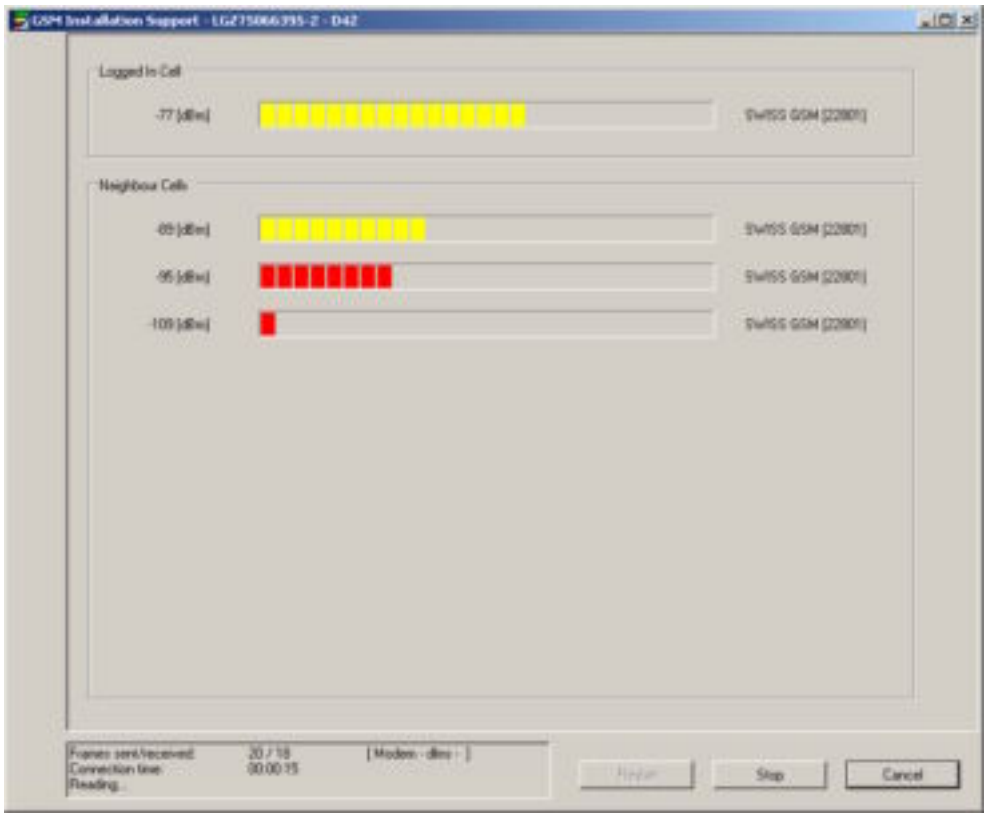
Chapter 12 "Functional Range per User Group" describes which diagnostic commands are available to the individual user groups.

7.4.1 GSM Installation Support

This diagnostic command can only be used if the meter connected has a communication unit with GSM modem.

For execution, select the "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 made of received field strength with remote connection.



Measurement of field strength is

- continuously updated if the values are read out via meter 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.

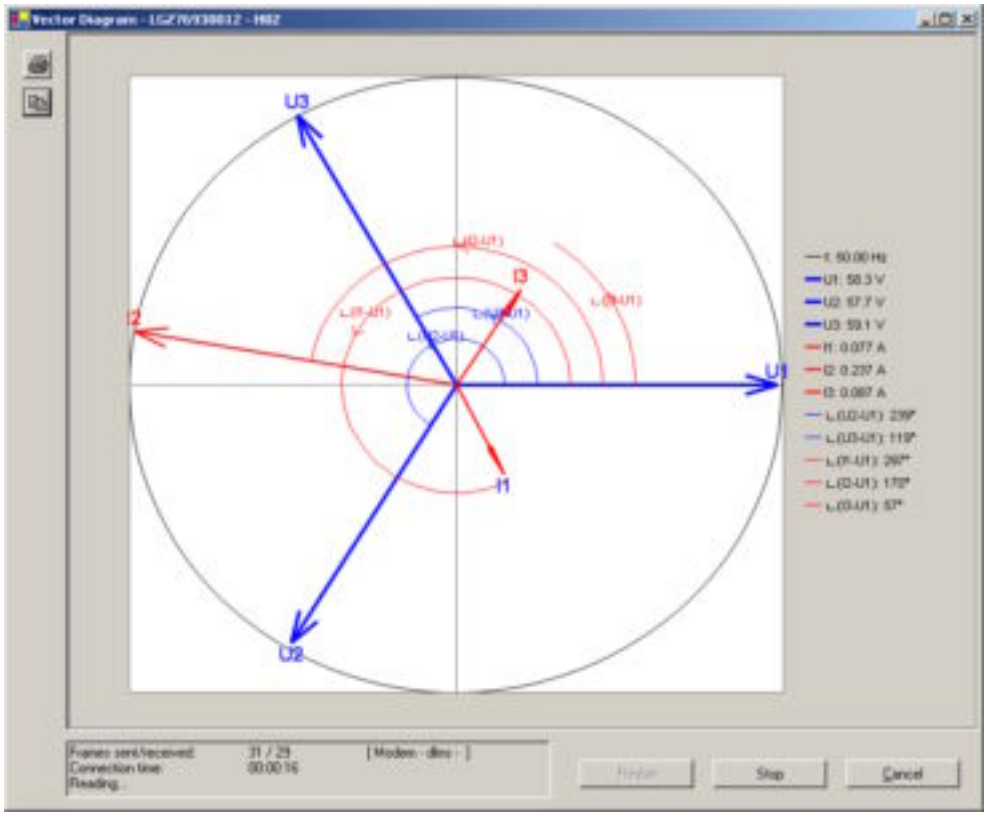
The diagnostic command is ended with **Cancel**.

7.4.2 Vector Diagram

A vector diagram of the currents and voltages of the meter connected can be displayed with this dagnostic 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 in the code are displayed.



Clicking **Stop** interrupts a current measurement.

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

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).

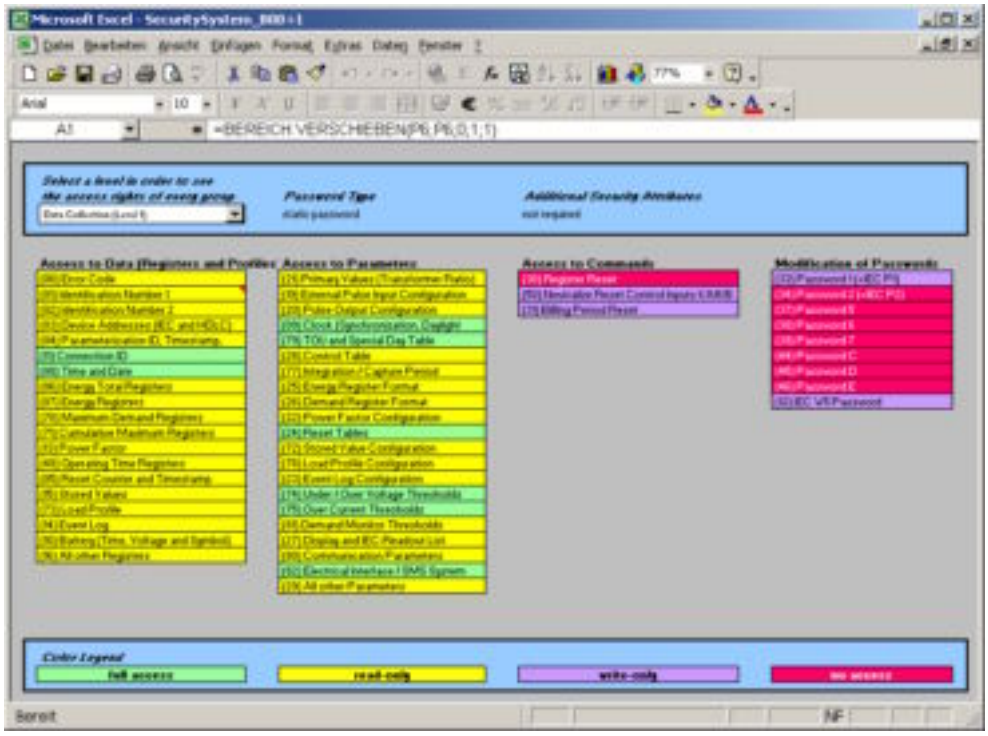
The diagnostic command is ended with **Cancel**.

7.4.3 Security System

With this diagnostic command the meter 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 are read from the meter 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 colors according to the color code.

7.4.4 Load Profile Analysis

With this diagnostic command an evaluation of the meter 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 entered in a dialogue window:

- one day (default)
- one week
- one month

before the likewise selectable final date (the starting date is calculated automatically).

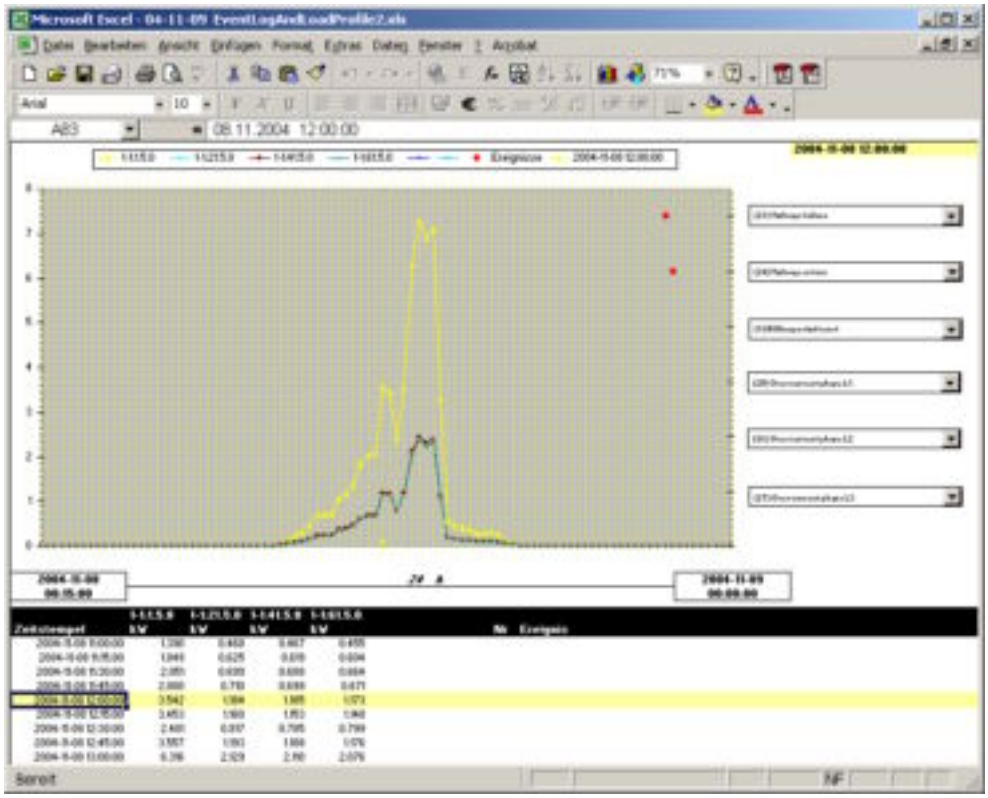
Note

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 meter has a short integrating period).

The load profile data are read from the meter connected.

The load profile data read out are 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 colors according to the color 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.

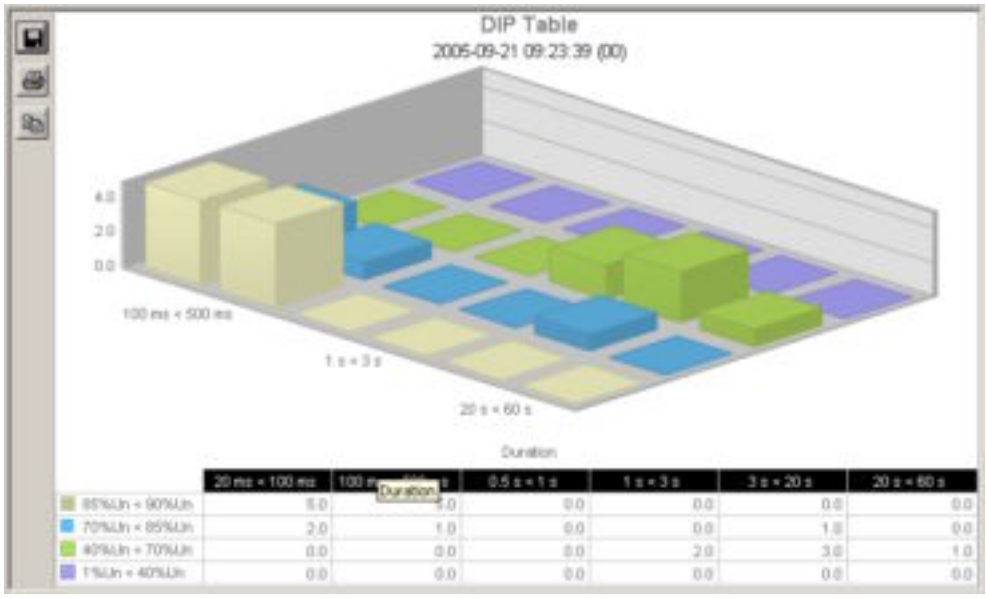
The individual load profile values and events can be seen in the table below the diagram. Navigation is possible in the table with the arrow keys or the wheel of a roller mouse. A vertical dotted line in the diagram indicates on which data in the table the cursor is currently placed.

7.4.5 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 display window.



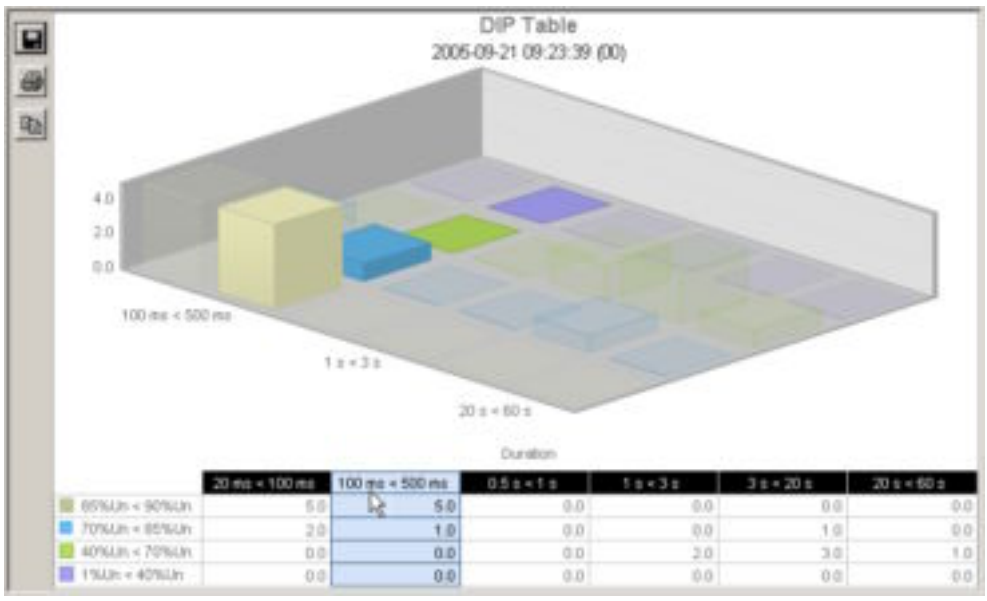
The categories, i.e. the severity of the voltage failures, is represented in color, e.g. voltage failures of 1 to 40 % of rated voltage in violet. The table contains a line for each category, the diagram a series of bars in the x-direction.

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

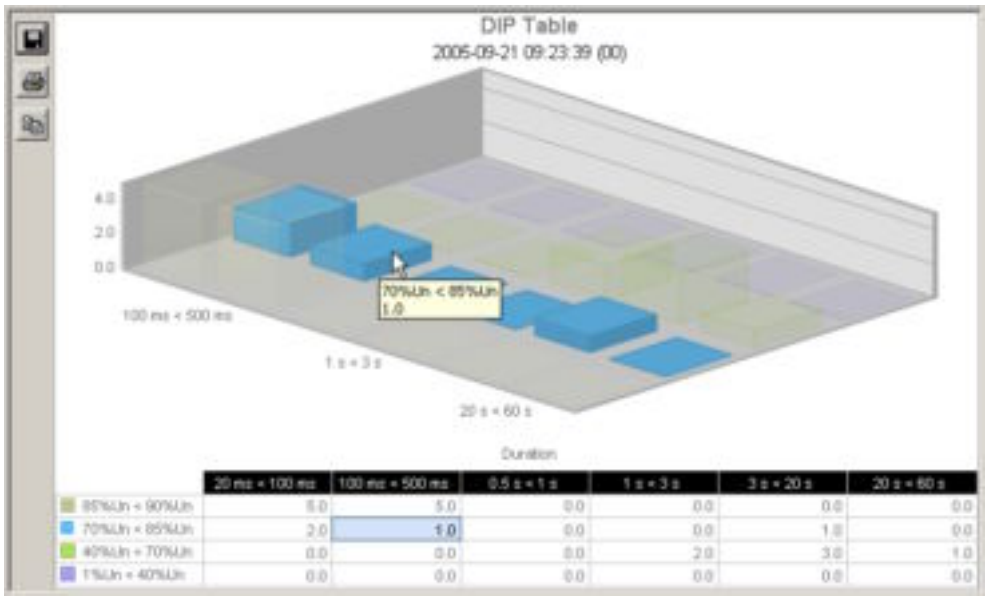
The duration of the voltage failures is divided into four ranges: 20 to 100 ms, 100 to 500 ms, 0.5 to 1 s and 1 to 3 s. The table contains a column for each range, the diagram a series of bars in the y-axis with bars of different color.

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

If the cursor is placed on a column or line heading or cell in the table, the corresponding bar series in the x or y axis or the relevant individual bar is shown highlighted.



Conversely if the cursor is placed on a bar in the diagram, the corresponding cell in the table is shown highlighted and the value also indicated in the diagram.



Clicking on  or with the right mouse key in the display window and then selecting the **Save as...** menu item in the pop-up menu appearing 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  displays a printing preview, from which the contents of the display window can be printed with the standard printer specified.

Clicking  copies the contents of the display window to the Windows clipboard, from where they 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.

7.5 Auxiliary Functions

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

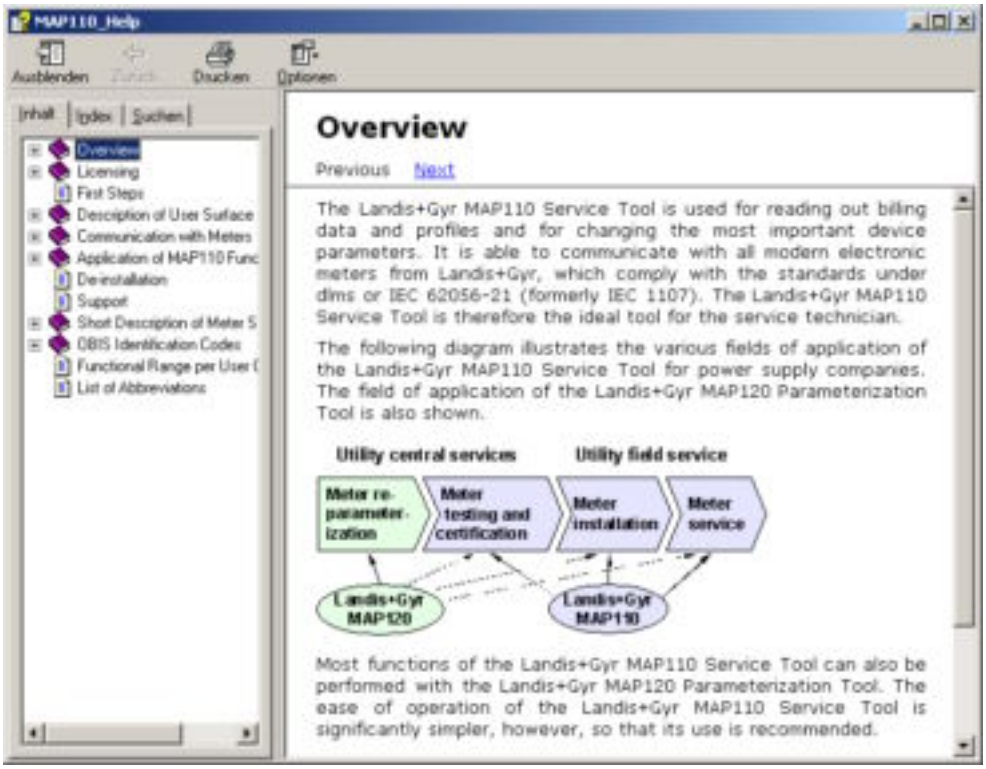
- displaying help topics
- displaying the current version of the program
- setting the color for inactive commands

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. Click on  in the tool bar or select **Help** from the **?** 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 personal computer.
3. Click on  to close the online help.

7.5.2 Displaying the Current Version of the Program

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

Note

Clear version description is the package release

The current program version is specified as package Version (second line of information).

Procedure:

1. Click on  in the tool bar or select **About** from the **?** menu.
   The "MAP110 - About" window appears. It contains information about the current version of the program.

2. Read the information displayed.
3. Click on **OK**.
   The "MAP110 - About" window disappears.

7.5.3 Setting Color for Inactive Commands

The color for emphasising inactive commands can be set individually with this setting (see also 5.8 "Command Tree").

Procedure:

1. Select **Options...** from the **Extras** menu.
   The "MAP110 - Options" window appears with the color currently selected for inactive commands.

2. Click on **Change...**.
   The "Color" window appears with a color pallet.

3. Select the desired color and then click on **OK**.
   The newly selected color for inactive commands is displayed in the "MAP110 - Options" window.

4. Click on **OK**.
   The "MAP110 - Options" window disappears and the inactive commands are emphasised in the new color in the command tree, provided this function is switched on.

8 De-installation

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

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 Landis+Gyr MAP110 Service Tool. Simply deleting the files and directories by means of the Window explorer delete functions does not remove all elements of the program (i.e. entries in the registry and in system files).

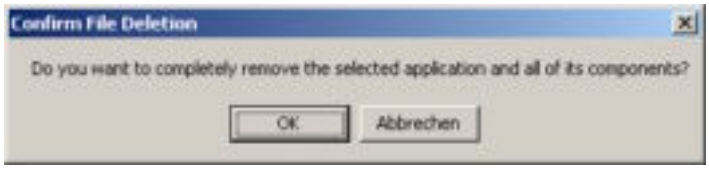
Note

Automatic de-installation of old versions

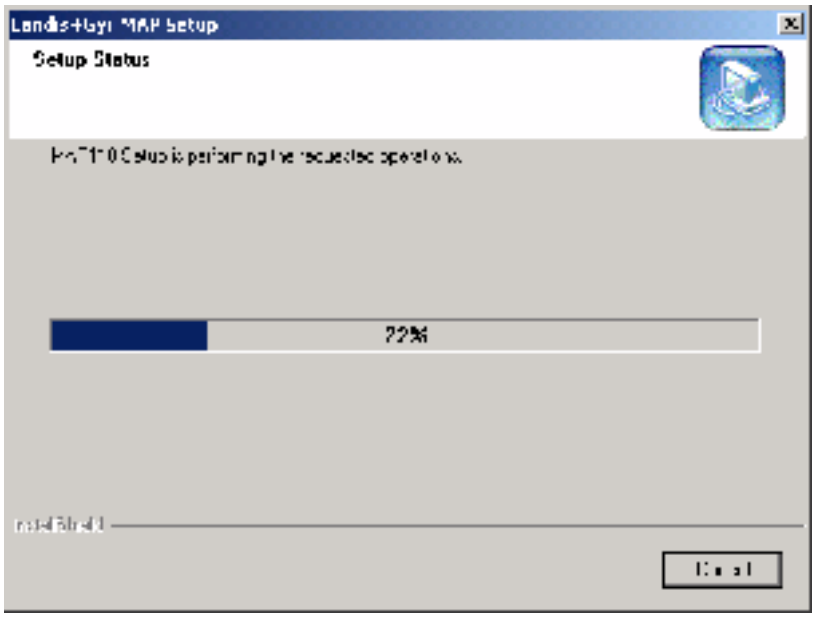
If the Landis+Gyr MAP110 Service Tool is to be updated with a later version, the old version is de-installed automatically by the installation program.

Procedure:

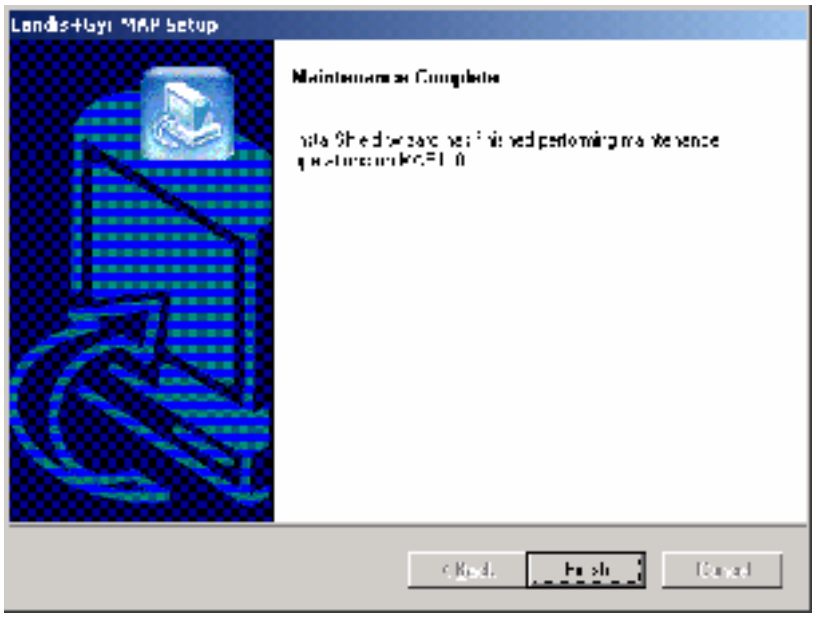
1. Click on **Start** and then select the **MAP110 Uninstall** command from the menu **Programs**, **Landis+Gyr MAP110**.
   The install shield starts running and asks you first whether you really want to completely remove the program and all of its components.



2. Click on **OK**.
   The de-installation is carried out and the progress is reported on the screen.



The successful completion is indicated with the following message.



3. Click on **Finish**.
   The de-installation process is completed.

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 chapter of this manual.
- Call up the help function as described in chapter 7.5.1 "Displaying Help Topics".
- Read the content of the file README.TXT, supplied with the software.

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

10 Short Description of Meter Security System

10.1 Introduction

The data and parameters of Landis+Gyr meters are protected against inadvertent or improper overwriting by a multistage security system.

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

10.2 Security Attributes

The meter and the communication unit feature several access levels with different security attributes. For each access level, the security attributes can be defined that must be fulfilled for a successful data access.

Switches protected by the certification seal

Under the main face plate, protected by the certification seal, there is a block of security switches. 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 opened.

Passwords

A password may be defined for some access levels. The utility may chose whether a static 8-character password or a coded 7-character password should be used.

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 meters feature 15 different access levels (level 0 to 9 and A to E) with different access rights each. A distinction is also made between read access and write access. For each register and each parameter, it can be defined which level is required to read and which level is required to write.

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

It should be noted when using the dims protocol that access is possible at all levels. If the IEC protocol is used exclusively for communication, only the lower 5 levels are available (level 0 to level 4).

The following security elements can still be selected for some levels:

- Password (if it is used)
- Access via the different communication channels can be enabled or disabled.

10.4 Access Levels and their Application

The table below describes all access levels with their security attributes and their typical application. For levels 0 to 4 access is possible via the dlms and IEC protocol, for levels 5 to F only via the dlms protocol.

Level	Security attributes	Access rights / application examples
0 Public Access (IEC and dlms)	without password without breaking a seal	This access level is always available. All dlms meters can be accessed on this level. All data can be read but there is no write access.
1 Data Collection (IEC and dlms)	with static password without breaking a seal	Readout of billing data by means of a handheld terminal or possibly by a central station. All billing data are readable. Limited write access possible, e.g. time/date.
2 Utility Field Service (IEC and dlms)	with coded password without breaking a seal Landis+Gyr Tool required because of coded password	Installation or maintenance tasks in the field. All parameters and all billing data are readable. Limited write access to settable data is possible, e.g. device addresses, identification numbers, phone numbers etc.
3 Utility Service (IEC and dlms)	without password breaking the utility seal necessary	Installation or maintenance work in the utility. All parameters and all billing data are readable. Write access to settable data is granted, e.g. battery operating time, switching tables etc.
4 Extended Utility Service (IEC and dlms)	without password breaking the verification seal necessary	Re-parameterisation in the utility. All parameters and all billing data are readable. Write access to settable and parameterisable data is granted, e.g. register clearing, password setting etc. After the access, a verification is required.
5 Extended Consumer (dlms only)	with static password without breaking a seal	Write access for the end user. All parameters and most billing data are readable. Write access to most user data is granted, e.g. monitor thresholds.
6 Remote Data Collection (dlms only)	with static password without breaking a seal no access via the optical interface	Readout of billing data by a central station. All billing data are readable. Limited write access is possible, e.g. time/date.
7 Remote Service (dlms only)	with static password without breaking a seal no access via the optical interface	Installation or maintenance work in connection with a central station. All parameters and all billing data are readable. Write access to a limited number of settable data is granted, e.g. switching tables, device addresses, identification numbers, phone numbers etc.
8, 9, A, B (dlms only)		Reserved for future expansion.

Level	Security attributes	Access rights / application examples
C Read Administrator (dlms only)	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 (dlms only)	with coded password breaking the verification seal necessary access via optical interface only Landis+Gyr Tool required because of coded password	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. No access is granted via telemetering systems. After the access, a verification is required.
E Distributor Service (dlms only)	with coded password breaking the verification seal necessary access via optical interface 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. No access is granted via telemetering systems. After the access, a verification is required.

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, cosφ, 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 meters 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 15. Only the values
0 (abstract objects) and
1 (electricity related objects)
appear in the Landis+Gyr MAP120 Parameterization Tool.

Group B

Group B of the OBIS identification can theoretically have values in the range between 0 and 255. Only the values
0 (no channel specified)
1 (channel 1) and
2 (channel 2)
appear in the Landis+Gyr MAP120 Parameterization 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. On the other hand, the values for items related to electricity are listed in the following table.

Value	Application
0	General purpose objects
1	Sum of all phases: active energy import (+A)
2	Sum of all phases: active energy export (-A)
3	Sum of all phases: reactive energy import (+R)
4	Sum of all phases: reactive energy export (-R)
5	Sum of all phases: reactive energy quadrant I (+Ri)
6	Sum of all phases: reactive energy quadrant II (-Rc)
7	Sum of all phases: reactive energy quadrant III (-Ri)
8	Sum of all phases: reactive energy quadrant IV (+Rc)
9	Sum of all phases: apparent energy import (+S)
10	Sum of all phases: apparent energy export (-S)
11	Any phase: current
12	Any phase: voltage
13	Average power factor ($\cos\varphi$)
14	Mains frequency (fn)
15	Sum of all phases: active energy quadrant I+IV+II+III
16	Sum of all phases: active energy quadrant I+IV-II-III
17	Sum of all phases: active energy quadrant I
18	Sum of all phases: active energy quadrant II
19	Sum of all phases: active energy quadrant III
20	Sum of all phases: active energy quadrant IV
21	Phase 1: active energy import
22	Phase 1: active energy export
23	Phase 1: reactive energy import
24	Phase 1: reactive energy export
25	Phase 1: reactive energy quadrant I
26	Phase 1: reactive energy quadrant II
27	Phase 1: reactive energy quadrant III
28	Phase 1: reactive energy quadrant IV
29	Phase 1: apparent energy import
30	Phase 1: apparent energy export
31	Phase 1: current
32	Phase 1: voltage

Value	Application
33	Phase 1: power factor
34	Phase 1: frequency
35	Phase 1: active energy quadrant I+IV+II+III
36	Phase 1: active energy quadrant I+IV-II-III
37	Phase 1: quadrant I
38	Phase 1: quadrant II
39	Phase 1: quadrant III
40	Phase 1: quadrant IV
41…60	Phase 2: same as 21…40
61…80	Phase 3: same as 21…40
81	Phase angles
82	Unitless quantity (pulses or pieces)
83...90	Not used
91	Neutral: current
92	Neutral: voltage
93...95	Not used
96	Electricity-related service entries
97	Electricity-related error messages
98	Electricity-related list objects
99	Data profiles
100...127	Reserved
128...254	Manufacturer-specific definitions Landis+Gyr: 130 = Sum of all phases: reactive energy quadrant I+IV+II+III 131 = Sum of all phases: reactive energy quadrant I+II-III-IV 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
255	Reserved

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 MAP120 Parameterization 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 MAP120 Parameterization 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:C.1.0	00	00	60	01	00	FF	Identification number 2.1
0-0:C.1.1	00	00	60	01	01	FF	Identification number 2.2
0-0:C.2.0	00	00	60	02	00	FF	Number of parameterisations
0-0:C.2.1	00	00	60	02	01	FF	Date and time of last parameterisation
0-0:C.2.2	00	00	60	02	02	FF	Activation date TOU
0-0:C.2.3	00	00	60	02	03	FF	Date of last RCR program change
0-0:C.240.0	00	00	60	F0	00	FF	EEPROM identification
0-0:C.240.13	00	00	60	F0	0D	FF	Hardware ID
0-0:C.3.1	00	00	60	03	01	FF	Input terminal states base meter
0-0:C.3.2	00	00	60	03	02	FF	Output terminal states base meter
0-0:C.4.0	00	00	60	04	00	FF	Internal control signal states
0-0:C.5.0	00	00	60	05	00	FF	Internal operating state
0-0:C.6.0	00	00	60	06	00	FF	Operating time of battery
0-0:C.6.3	00	00	60	06	03	FF	Battery voltage
0-0:C.7.0	00	00	60	07	00	FF	Number of phase fails L1..L3
0-0:C.7.1	00	00	60	07	01	FF	Number of phase fails L1
0-0:C.7.2	00	00	60	07	02	FF	Number of phase fails L2
0-0:C.7.3	00	00	60	07	03	FF	Number of phase fails L3
0-0:C.8.0	00	00	60	08	00	FF	Total operating time
0-0:C.8.t	00	00	60	08	t	FF	Operating time (t = tariff number)

OBIS code (decimal)	OBIS code (hex)						Description
	A	B	C	D	E	F	
0-0:C.90	00	00	60	5A	FF	FF	Configuration ID
0-0:C.90.1	00	00	60	5A	01	FF	Physical IEC device address
0-0:C.90.2	00	00	60	5A	02	FF	Physical HDLC device address
1-0:C.2.7	00	00	60	02	07	FF	Activation date passive TOU
0-0:F.F.0	00	00	61	61	00	FF	Error code register
0-0:L.1.0*126	00	00	62	01	00	7E	Stored values
0-0:240.1.0	00	00	F0	01	00	FF	Meter functions
0-1:C.2.5	00	01	60	02	05	FF	Date and time of last calibration
0-1:C.240.8	00	01	60	F0	08	FF	Hardware ID of base meter
0-1:C.3.1	00	01	60	03	01	FF	Input terminal states extension board
0-1:C.3.2	00	01	60	03	02	FF	Output terminal states extension board
0-2:C.240.8	00	02	60	F0	08	FF	Hardware ID of extension board
0-2:C.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
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:C.99.8	01	00	60	69	08	FF	Display and IEC readout ID
1-0:P.1.0	01	00	63	01	00	FF	Load profile
1-0:P.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

OBIS code (decimal)	OBIS code (hex)						Description
	A	B	C	D	E	F	
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
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)

OBIS code (decimal)	OBIS code (hex)						Description
	A	B	C	D	E	F	
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 all user groups (note right-hand columns for dlms and IEC).

Read Commands

User Group							
					Consumer (final customer)		
					Reader		
					Installation (field use)		
					Engineering (laboratory use)		
					Certification		
					Read Commands	**dlms**	**IEC**
•	•	•	•	•	Data Readout	•	•
•	•	•	•	•	Emergency Readout		•
•	•	•	•	•	Date and Time	•	•
•	•	•	•	•	Time Base	•	
•	•	•	•	•	Load Profile	•	R5
	•	•	•	•	Event Log	•	R5
•	•	•	•	•	Stored Values	•	
	•	•	•	•	Energy and Total Energy Registers	•	
	•	•	•	•	Demand and Power Factor Registers	•	
	•	•	•	•	Identification Numbers	•	•
•	•	•	•	•	Connection ID	•	
•	•	•	•	•	Parameterization ID	•	
		•	•	•	Physical Device Addresses	•	IEC
		•	•	•	Optical and Electrical Interfaces	•	
		•	•	•	Interfaces Communication Unit	•	
		•	•	•	Operating Mode RS485	•	
		•	•	•	IEC Access on Communication Unit	•	
			•	•	CS/S0+ Type	•	
		•	•	•	Modem Telefon Number	•	
		•	•	•	PIN State	•	
		•	•	•	Instantaneous Values	•	
		•	•	•	Passive and Active TOU ID	•	
			•	•	Operating Time Registers	•	
	•	•	•	•	Power Factor Monitor Thresholds	•	
	•	•	•	•	Battery Operating Time	•	
	•	•	•	•	Battery Voltage	•	
•	•	•	•	•	Billing Period Counter	•	
	•	•	•	•	Time and Date of Last Billing Period Reset	•	
			•	•	Billing Period Reset Settings	•	
			•	•	Energy Snapshot Settings	•	

Write Commands

					User Group		
					Consumer (final customer)		
					Reader		
					Installation (field use)		
					Engineering (laboratory use)		
					Certification		
					Write Commands	**dlms**	**IEC**
	•	•	•	•	Set Time and Date according to PC Time	•	•
	•	•	•	•	Date and Time	•	•
		•	•	•	Time Base	•	
		•	•	•	Identification Numbers	•	•
		•	•	•	Connection ID	•	
		•	•	•	Set passive TOU activation time to	•	
			•	•	Billing Period Reset Settings	•	
			•	•	Energy Snapshot Settings	•	
		•	•	•	Power Factor Monitor Thresholds	•	
		•	•	•	Physical Device Addresses	•	IEC
		•	•	•	Optical and Electrical Interfaces	•	
		•	•	•	Interfaces Communication Unit	•	
		•	•	•	Operating Mode RS485	•	
		•	•	•	IEC Access on Communication Unit	•	
			•	•	CS/S0+ Type	•	
		•	•	•	PIN Code	•	
		•	•	•	Modem Telefon Number	•	
			•	•	Passwords	•	•

Execute Commands

					User Group		
					Consumer (final customer)		
					Reader		
					Installation (field use)		
					Engineering (laboratory use)		
					Certification		
					Execute Commands	**dlms**	**IEC**
	•	•	•	•	Billing Period Reset	•	•
	•	•	•	•	Neutralize KA/KB Inputs	•	
		•	•	•	Test Mode on/off	•	•
		•	•	•	Reset Battery Operating Time	•	•
		•	•	•	Activate passive TOU now	•	
				•	Reset all Registers	•	
				•	Reset Energy Registers	•	•
				•	Reset Energy Total Registers	•	
				•	Reset Error Register	•	•
				•	Reset Diagnostic Registers	•	
				•	Reset Counters	•	
				•	Reset Demand Registers	•	•
				•	Reset Stored Values	•	•
				•	Reset Load Profile	•	•
				•	Reset Event Log	•	W5
				•	Reset Alarm	•	
				•	Reset Alert	•	

Diagnostic Functions

					User group		
					Consumer (final customer)		
					Reader		
					Installation (field use)		
					Engineering (laboratory use)		
					Certification		
					Diagnostic Functions	**dlms**	**IEC**
•	•	•	•	•	Load Profile Analysis *	•	
•	•	•	•	•	DIP Table	•	
•	•	•	•	•	Reset DIP Table	•	
		•	•	•	GSM Installation Support	•	
		•	•	•	Vector Diagram	•	
		•	•	•	Security System *	•	

* MS Excel is required to perform these diagnostic functions.

13 List of Abbreviations

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

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 Parameterization Tool.
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 meter.
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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