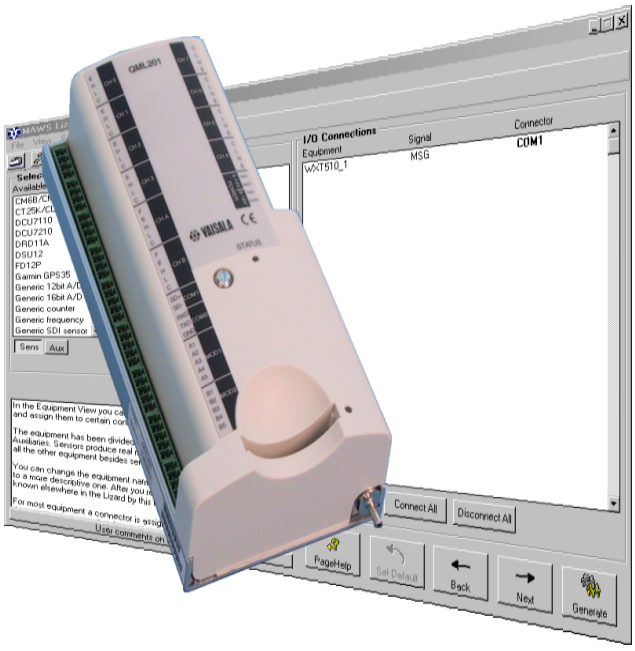
VAISALA

USER'S GUIDE

Vaisala HydroMet™ Data Collection Platform
Volume 2



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CHAPTER 1

GENERAL INFORMATION

This chapter provides general notes for the product(s) and this manual.

About This Manual

This manual supplements Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 1, and contains more detailed and advanced information on creating and modifying setups. Applicable for data logger QML201A and Lizard Setup Software versions 6.01, and AWS Client terminal software version 6.01.

Structure of the Data Collection Platform Documentation

The information in the Vaisala HydroMet™ Data Collection Platform manual set is divided between the different manuals in the documentation set as outlined in Table 1 on page 12.

Table 1 Structure of the DCP Manual Set

Manual	Code	Content
User's Guide, Volume 1	M210784EN	Overview of the data collection platform, the QML logger, and related accessories. PC software installation instructions. Operating instructions for AWS Client software, YourVIEW Basic Display Software, and basic use of Lizard Setup Software.
User's Guide, Volume 2	M210785EN	Operating instructions for Lizard Setup Software
User's Guide, Volume 3	M210933EN	Telemetry and sensor configuration in Lizard Setup Software
Installation Manual (Field Equipment)	M210786EN	Installation information on the Data Collection Platform with meteorological and/or hydrological sensors

Contents of This Manual

This manual consists of the following chapters:

- Chapter 1, General Information: This chapter provides general notes for the product(s) and this manual.
- Chapter 2, Product Overview: This chapter introduces Lizard Setup Software.
- Chapter 3, Basic Use of Lizard Setup Software: This chapter provides instructions for the basic use of Lizard Setup Software which is used to modify the software parameters and operation of the QML logger.
- Chapter 4, Advanced Use of Lizard Setup Software: This chapter provides information on the advanced use of Lizard Setup Software.

Related Manuals

Table 2 Related Manuals

Manual Code	Manual Name
M210784EN	Vaisala HydroMet™ Data Collection Platform Volume 1 - User's Guide
M210933EN	Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 3
M210786EN	Vaisala HydroMet™ Data Collection Platform Installation Manual
M210629EN	Automatic Weather Station MAWS101 - User's Guide
M210630EN	Automatic Weather Station MAWS201 - User's Guide
M210743EN	Voice Option for MAWS - Technical Reference

Safety

Throughout the manual, important safety considerations are highlighted as follows:

WARNING Warning alerts you to a serious hazard. If you do not read and follow instructions very carefully at this point, there is a risk of injury or even death.

CAUTION Caution warns you of a potential hazard. If you do not read and follow instructions carefully at this point, the product could be damaged or important data could be lost.

NOTE Note highlights important information on using the product.

Product Related Safety Precautions

The product has been tested for safety and approved as shipped from the factory. The following safety precautions are not related to any specific procedures and therefore do not appear elsewhere in this manual. They are recommended precautions that personnel must understand and apply during different phases of operation and maintenance.

WARNING Keep away from live circuits. Operating personnel must observe safety regulations at all times. Component replacement or internal adjustments must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltages may exist for some time even with the power cable disconnected. To avoid injuries, disconnect power and discharge circuits before touching them.

WARNING Do not service alone. Under no circumstances should any person reach into parts and assemblies that are mains powered and alive, for the purpose of servicing, except in the presence of someone who is capable of rendering aid.

WARNING Personnel working with or near high voltages should be familiar with modern methods of resuscitation.

WARNING Do not service a live system outdoors. Do not open units outdoors when the enclosure used contains line voltage levels.

WARNING Do not operate in an explosive atmosphere, for example, when flammable gases or fumes are present. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.

WARNING Do not substitute parts or modify the instrument. Because of the danger of introducing additional hazards, do not install unsuitable parts in the instrument. Contact Vaisala or its authorized representative for repairs to ensure that safety features are maintained.

CAUTION Do not make changes to the wiring. Incorrect wiring can damage the device and prevent it from operating correctly.

CAUTION Risk of explosion if the battery is replaced with an incorrect type.

ESD Protection

Electrostatic Discharge (ESD) can cause immediate or latent damage to electronic circuits. Vaisala products are adequately protected against ESD for their intended use. However, it is possible to damage the product by delivering electrostatic discharges when touching, removing, or inserting any objects inside the equipment housing.

To make sure you are not delivering high static voltages yourself:

- Handle ESD sensitive components on a properly grounded and protected ESD workbench. When this is not possible, ground yourself with a wrist strap and a resistive connection cord to the equipment chassis before touching the boards. When neither of the above is possible, at least touch a conductive part of the equipment chassis with your other hand before touching the boards.
- Always hold the boards by the edges and avoid touching the component contacts.

Recycling

Recycle all applicable material.

Dispose of batteries and the unit according to statutory regulations. Do not dispose of with regular household refuse.

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Redistribution License Agreement

The QML logger software uses the TCP/IP stack produced by the "lwIP Lightweight TCP/IP stack" -project with the following copyright and license:

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WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Warranty

For certain products Vaisala normally gives a limited one-year warranty. Please observe that any such warranty may not be valid in case of damage due to normal wear and tear, exceptional operating conditions, negligent handling or installation, or unauthorized modifications. Please see the applicable supply contract or Conditions of Sale for details of the warranty for each product.

CHAPTER 2

PRODUCT OVERVIEW

This chapter introduces Lizard Setup Software.

Lizard Setup Software

With Lizard Setup Software you can easily create or modify a setup file that informs the QML logger how to operate.

Creating a setup with Lizard Setup Software consists of three stages. First, you define an assembly for the weather station. Then you define the necessary measurements and the calculations derived from them. And finally, you define the log groups and reports from the measurement results along with communication settings for transmitting data to and from the QML logger.

The setup file on your PC is finally generated, in other words converted into a format that the QML logger understands, and then transferred into the logger and taken into use.

You can store all settings in the Lizard setup library where they are easily available for modifications or for creating a new setup based on an existing one. Also, you can use the import/export function to add new setup files to the library or to send the existing ones, for example, to Vaisala HelpDesk in case of a problem situation.

CHAPTER 3

BASIC USE OF LIZARD SETUP SOFTWARE

This chapter provides instructions for the basic use of Lizard Setup Software which is used to modify the software parameters and operation of the QML logger. Detailed information on configuring the sensors and telemetry options is presented in Volume 3.

Starting Lizard Setup Software

You can start Lizard Setup Software by using either of the following two alternatives:

1. Double-click the Lizard icon on your desktop.

   or

2. Click the **Start** button and select **Programs - Vaisala - MAWS Lizard**.

Introduction to Lizard User Interface

The basic function of Lizard Setup Software is to create different setups for the QML logger. A setup is created by going through all the Lizard modules, which in this manual are referred to as *views*. For further information on creating and modifying setups, refer to section Setup Management on page 27.

An example view of the user interface is presented in Figure 1 on page 22. Work in the views from left to right. This means that you usually have to select some items in the upper left of the view and then configure or edit the details on the right of the view. In other words, you work from left to right and towards greater detail.

On the lower left of each view there is an information pane which is used for both a page help and for displaying general help information on selected items. These help systems will be further discussed in section Online Help on page 26.

Configurable items in bold print can usually be edited. For example, you can rename parameters by double-clicking on the item. You can also use the **F4** key for this.

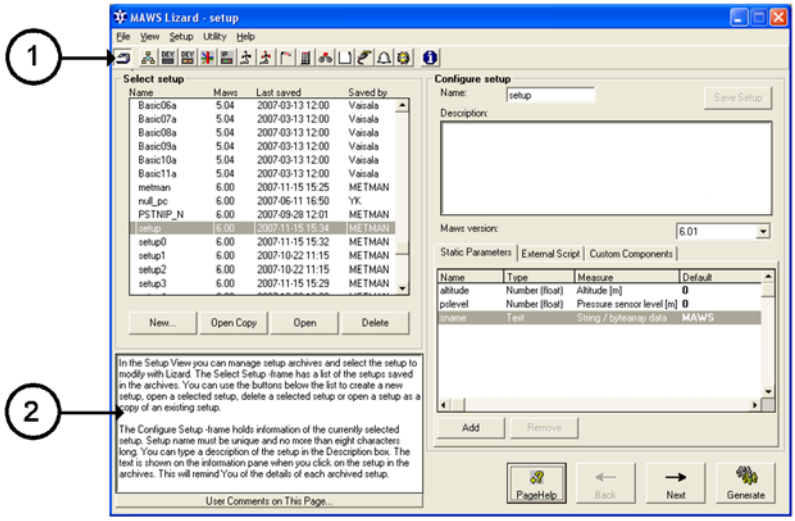

Figure 1 Example View of User Interface

The following numbers refer to Figure 1 on page 22:

1 = Toolbar

2 = Information pane

Menu Bar

The menu bar in the user interface views contains five menus: **File**, **View**, **Setup**, **Utility**, and **Help**. Most of the features provided by the menus are also available elsewhere in the application.

The **File** menu includes the **Import Setup** and **Export Setup** functions, which are further discussed in sections Importing a Setup on page 32 and Exporting a Setup on page 32, as well as the **Import multiple** and **Export All** functions, which are discussed in sections Importing Multiple Setups on page 33 and Exporting All Setups on page 33. This menu also includes an **Exit** function.

The **View** menu includes all the modules or views as items, which means that you can also enter the views from this menu. This menu also includes an **Options** feature, the functions of which are further discussed in section Changing the User Level to Advanced on page 111 and section Generating and Uploading a Setup on page 107. In the View menu, you can also start the Wizard tool for creating new setups. For more information on the Wizard, see Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 1.

The **Setup** menu includes the features **Generate**, **Generate setup with script comments** and **Save**. These features are further discussed in sections Saving Changes on page 26 and Generating and Uploading a Setup on page 107. The **Setup** menu also contains the advanced features **Script Viewer** for viewing and modifying QML logger scripts, **Subsets** for parametrization of setup components, and **Parameter Sets** for configuring QML logger parameter sets. For more information on parameter sets, refer to the Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 3.

The **Utility** menu includes the **Copy** and **Paste** functions which are further discussed in sections Copying Calculations on page 57 and Copying Reports on page 87. A third function, **Wizard**, becomes available in the **Measurement** view if you select a generic 16-bit measurement; then, selecting the **Wizard** function will display an additional selection dialog.

The **Help** menu enables you to access program version information.

Selecting User Level

Lizard Setup Software includes the following user levels:

- **Normal** user level is the default option. It allows you to create a setup in a very fast and simple way, using default options for most parameters. This option is recommended for all users.
- **Advanced** user level is for experienced users only. On this level you will have access to more parameters, thus allowing you to create a setup with more advanced features. For further information on these advanced features, refer to Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 3.

To change the user level, proceed as follows:

1. Choose **Options** from the **View** menu.
2. Under the **General** tab, select the desired user level and click **OK**.

NOTE	Changing the user level from Normal to Advanced brings up more alternatives for your selection, thus requiring profound understanding of the system behavior.

Toolbar

Figure 2 Lizard Setup Software Toolbar

Each of the buttons on the toolbar of a user interface view opens another view of Lizard. By default, Lizard opens in the **Setup** view. The buttons and the corresponding views they open are as follows:

	Setup Management view, see section Setup Management on page 27
	Optional Hardware view, see section Optional Hardware View on page 34

	Devices view, see section Devices View on page 37
	Device Configurations view, see section Device Configurations View on page 39
	Communication interfaces view, see section Communication Interfaces View on page 43
	IP services view, see section IP Services View on page 44
	Equipment view, see section Equipment View on page 46
	Additional sensors view, see section Additional Sensors View on page 49
	Measurements view, see section Measurements View on page 50
	Calculations view, see section Calculations View on page 52
	, see section Logging View on page 60
	Reports view, see section Reports View on page 71
	Communications view, see section Communications View on page 89
	Alarms view, see section Alarms View on page 95
	Timers view, see section Timers View on page 100
	Setup Information view, see section Setup Information View on page 103

Buttons

All setup views contain several basic buttons on the lower right. These include the **PageHelp** button, **Next** and **Back** buttons, and **Generate** buttons. The **Timer** view, additionally, contains the **Set Default** button.

The **PageHelp** button retrieves the Page help as described in section Page Help on page 27. The **Next** and **Back** buttons allow you to navigate by easily moving between the different setup views. You can also navigate using the toolbar.

The **Generate** button generates the current setup, in order to upload it to the weather station.

In the **Timer** view, use the Set Default button to retrieve the Lizard default settings after incorrect alterations.

Saving Changes

When you modify settings in normal operation, the changes are automatically saved as you move on to the next setting.

Although modifications are automatically saved into the setup, the setup is not automatically saved into the archives. To save the current version into the setup archives, proceed as follows:

1. Return to the **Setup** view.
2. Click the **Save Setup** button located in the **Configure setup** frame.

It is not necessary to save the setup in the archives every time you change a setting. Save the setup when you particularly want to archive it, for example, when you have finished modifying the entire setup.

Online Help

Currently Lizard Setup Software offers two ways of getting online help:

1. Information pane, which displays general help information on selected items
2. Page help

Information Pane

When you click on an item, a brief description of the item appears in the information pane on the lower left. The information pane displays helpful information and details on selected items in the view. For an example of the information pane, refer to Figure 1 on page 22.

Page Help

When you open each setup view, the information pane on the lower left of the view, shown in Figure 1 on page 22, displays a page help. This is a brief description of the particular view and its functions. You can later retrieve the page help by clicking the **PageHelp** button.

User Comments

You can add your own comments in each Lizard view. Click **User comments on this page** below the information pane to add view-specific comments. The maximum number of characters allowed is 255.

Setup Management

The **Setup** view opens by default when you open Lizard Setup Software; see Figure 3 on page 28. In this view you can open, manage and modify different setups. In addition, you can manage setup archives and import or export separate setups from one Lizard to another.

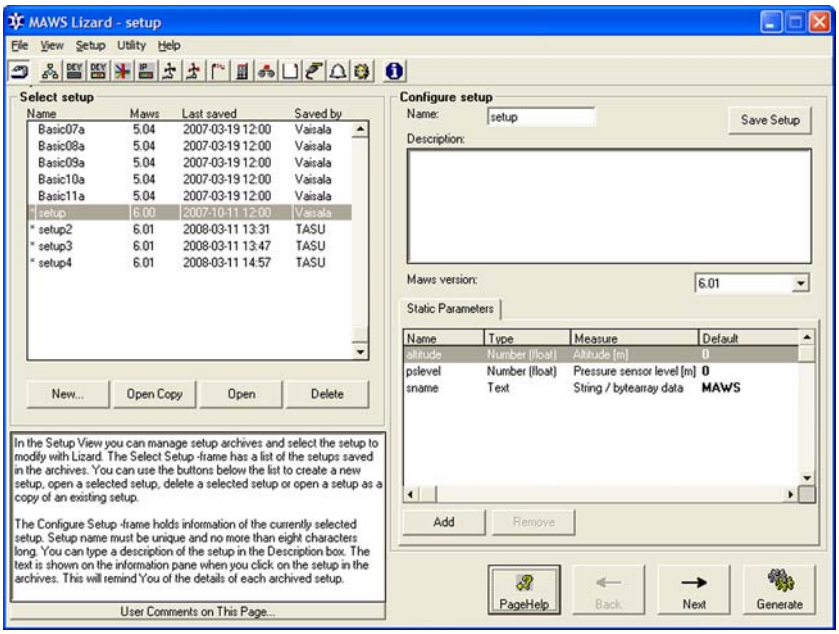

Figure 3 Setup View

Layout of the Setup View

The **Setup** view is divided into two parts. The **Select Setup** frame on the left acts as setup archives, whereas the **Configure Setup** frame on the right displays the current setup.

Select Setup (Setup Archives)

The **Select Setup** frame, in other words, the setup archives, list all the different setups that have been created and archived for the Lizard software in use. A brief description of each setup in the archives can be viewed by clicking on the setup of interest. The description appears in the information pane, below the setup archives frame.

The **Select Setup** frame is divided into three lists. The **Name** list contains the names of the setups. The names must be unique and no more than eight characters long. An asterisk (*) in front of a setup name indicates that the setup has been created with the Wizard tool. For further information on creating setups with the Wizard tool, please refer to Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 1.

The **Maws** version list displays the QML logger version for which the setup was configured. This setting affects, for example, the selection of sensors and calculations. If you have selected the correct version, you cannot make selections with your Lizard that your QML logger with the particular software version does not support. If the version you select is higher than the one your QML logger actually has, the logger will not run the setup file. Also note that the Lizard views for configuring IP-based communications are not visible for setups created for QML logger versions earlier than 6.00.

The **Last Saved** list contains the date and time of the setup versions, and the **Saved by** list the user name of the person who last saved the setup (based on Windows user names).

Configure Setup (Current Setup)

The **Configure Setup** frame displays the setup currently being modified. It also gives almost the same basic information, name, description, and the version of the current setup as the setup archives do.

Opening a Setup

There are different ways to open a setup. You can create an entirely new setup, create a copy of an existing setup for modification, or open an existing setup for modification or uploading. You can also create a setup with the Wizard tool. For further information on using the Wizard tool, please refer to Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 1.

Creating a New Setup

To create a new setup, proceed as follows:

1. Click **New**.
2. A **New Setup** window opens asking you to name the new setup and to select the version number. The name must be unique and no longer than eight characters. Lizard automatically suggests the highest possible version number. Enter the name and, if necessary, modify the version number, and click **OK**.

NOTE	If the software version number you select is higher than the one your QML logger actually has, the logger will not run the setup file.

3. The new setup will then appear as the current setup in the **Configure Setup** frame. Enter a description for the setup into the **Description** box.

You have created a new, empty setup, which includes only the basic, fixed elements. You can now modify the setup by proceeding to the following views.

Creating a Copy for Modification

To create a setup by copying of an existing one for modification, proceed as follows:

1. Select the setup you want to modify from the **Select Setup** frame by clicking on it.
2. Click the **Open Copy** button.
3. The existing setup is copied and it appears in the **Configure Setup** frame with a slightly different name.
4. If necessary, you can edit the name, the description, and the version of the setup.

NOTE	If the software version number you select is higher than the one your QML logger actually has, the logger will not run the setup file.

You have now created a new setup by copying an existing one. This setup consists of the settings of the previous setup. You can modify the settings by proceeding to the following views. The original setup remains in the archives unchanged.

Opening an Existing Setup

To open an existing setup for modification or uploading, proceed as follows:

1. Select the setup you want to modify or upload from the **Select Setup** frame by clicking on it.
2. Click **Open**.
3. The selected setup appears in the **Configure Setup** frame.
4. If necessary, you can edit the name, the description, and the version of the setup.

NOTE	If the software version number you select is higher than the one your QML logger actually has, the logger will not run the setup file.

You have now created a new setup by modifying an existing one without making a copy of it. You can modify the setup further by proceeding to the following views. Note that the original setup still exists in the archives, but saving the modified setup will overwrite the original with the new modifications.

Saving a Setup

In normal operation, when you modify settings, your changes are automatically saved as you move onto the next view.

Although modifications are automatically saved into the setup, the setup is not automatically saved into the archives. To save the current version into the setup archives, return to the **Setup** view and click the **Save Setup** button located on the upper right of the **Configure Setup** frame.

It is not necessary to save the setup in the archives every time you change a setting. It is only necessary when you particularly want to archive the setup, for example, when you have finished modifying the entire setup.

Deleting a Setup

To delete a setup, proceed as follows:

1. Select the setup you want to delete from the **Select Setup** frame by clicking on it.
2. Click the **Delete** button.

The setup is permanently deleted.

Exporting a Setup

The Lizard setup database is very large and often cannot be transported on a disk or via e-mail. For this reason Lizard Setup Software contains a system specifically designed for exporting and importing individual setups from one Lizard to another.

To export a setup, proceed as follows:

1. Open the setup to be exported by selecting it from the **Select Setup** frame and clicking the **Open** button. This is an important step as you can only export the current setup.
2. Click **File** on the menu bar and select **Export setup**.
3. The **Export setup** window will open. Click the **Select** button to select the export folder.
4. The **Export current setup to file** window will open asking you to select where you want the setup exported. Make the selection and click **Save**.

You have now exported the current setup. A copy of the setup will remain in the archives. After the setup has been exported, it can be copied onto a disk or sent via e-mail.

Importing a Setup

To import an exported setup, proceed as follows:

1. Click **File** on the menu bar and select **Import setup**.
2. The **Import setup from file to current** window will open asking you to choose the setup to be imported. Select the setup and click **Open**.
3. The **New Setup** window will open asking you to name the setup and to select the version number. Enter the name and the version number and click **OK**.
4. The setup will be imported to replace the current setup.

NOTE	Importing a setup may take a while.

5. Click the **Save Setup** button in the **Configure Setup** frame to save the setup in the archives.

Exporting All Setups

With the **Export All** function, you can export all the setups from the setup archives. This is useful for backup purposes.

NOTE	Before starting the export procedure, make sure that the destination folder does not contain earlier copies of the setup files, as they will be overwritten.

To export all setups, proceed as follows:

1. Save the setup you have been configuring, as Lizard opens all setups during the export procedure.
2. Click **File** on the menu bar and select **Export All**.
3. The **Export setup** window will open. Click the **Select** button to select the export folder.
4. The **Browse for Folder** window will open asking you to select the export folder. Make the selection, and click **OK**.

The setups are exported from the setup archives. Progress information will be shown in the information pane.

Importing Multiple Setups

With the **Import Multiple** function, you can import multiple setups to the setup archives. This is useful for backup purposes and also for providing compatibility between different Lizard versions.

NOTE	Before starting the import procedure, make sure that the setups you select are not already in the setup archives, as they will be overwritten.

To import multiple setups, proceed as follows:

1. Click **File** on the menu bar and select **Import Multiple**.

2. The **Import multiple files to archive** window will open asking you to choose the setups to be imported. Select the setups and click **Open**.

The setups are imported into the setup archives. Progress information will be shown in the information pane.

NOTE	Importing setups may take a while.

Making Backups

The Lizard setup archives are not designed for long-term data storage. A better way to store information is to make backups by, for example, exporting setups. See sections Exporting a Setup on page 32 and Exporting All Setups on page 33.

NOTE	The information pane with general help information is available on all the configurable items in case you need more detailed information.

Optional Hardware View

In the **Optional Hardware** view you can select the optional hardware modules and configure them; see Figure 4 on page 35.

The hardware modules discussed in this section refer to the optional QML logger hardware, that is, the hardware inside the logger, not the sensors or any of the auxiliary equipment.

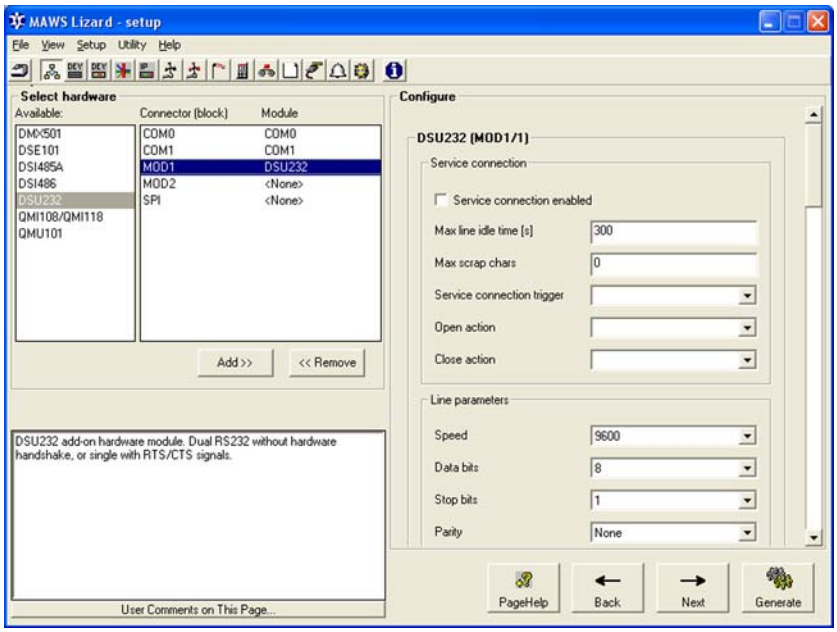

Figure 4 Optional Hardware View

NOTE	Lizard Setup Software does not have an online connection to the QML logger when the setup is being created, and it does not know which hardware is connected to the weather station. Therefore, all additional hardware must be configured using this view. Also, all the added optional hardware must be installed onto the weather station, otherwise the setup will not run.

Selecting Hardware

The **Select Hardware** frame on the upper left of the view is divided into two list boxes. The **Available** list box provides a list of all the available hardware modules. In the **Connector / Module** list box, the **Connector (block)** list includes all the connectors to which the modules can be connected. The **Module** list shows the connected modules.

The COM0 and COM1 communications ports already exist in the hardware module list. Select the other modules.

To select the optional hardware used with the QML logger:

1. Click on a hardware module in the **Available** list.

2. Drag it into the correct place in the **Module** list or click on the correct line and then click the **Add** button.

Removing Hardware

To remove optional hardware from the setup:

1. Select the hardware module to be removed by clicking on the appropriate row.
2. Click the **Remove** button.

Configuring Hardware Modules

To make the setup work properly, the hardware module parameters must have the correct settings. The list of configurable items may vary depending on the selected module. For the basic hardware modules, default settings have already been made. You do not necessarily need to change these default settings.

NOTE	The following example illustrates the configuration of the fixed COM0 communication port. The list of the configurable items varies according to the module.

To configure the settings of a communication port:

1. Select the **Service connection enabled** option to enable service connection. This allows you to access service functions, such as software upload, log file download, and time setting.

   You are recommended to keep the service connection enabled at least for the COM0 port (default).

2. Set the basic communication parameters, data transfer speed, data stop, bit stop, and parity in the **Line parameters** frame by selecting the correct options from the corresponding combo boxes.

   You are recommended to keep the parameters for the COM0 port in their default values: *9600, 8, 1, none*.

3. Choose the correct handshake options by selecting the desired check boxes under **Handshake** options. The flow control options using the XON/XOFF characters are individually selectable for reception and transmission. You can also define the **Receive**

buffer limit (%): the receive flow control is activated/cleared when the amount of free space in the receive buffer passes this limit (percentage of total buffer size).

4. Select the correct transmit control parameters in the **Transmit control** frame. These parameters allow you to control external hardware, such as the radio modem. You can enable transmit control using the RTS signal, as well as choose the RTS output polarity **(normal or reverse)**.

   In addition, you can switch on the transmitter of the radio before actual transmission using the RTS signal with a configurable delay. When the transmission has finished, the transmitter can be switched off with another delay setting. Alternatively, this parameter can be used to keep the radio transmitter enabled after the last character has been transmitted.

5. Set the correct transmit and receive buffers in the **Buffers** frame. This sets the internal buffer sizes in the QML logger. Normally these values should be left to their defaults. In case you have changed the parameters but want to return to the default settings, click the **Set Default** button.

NOTE	The information pane with general help information is available on all the configurable items in case you need more information.

Devices View

In the **Devices** view you can select the communications devices to be included in your setup and assign them to connectors; see Figure 5 on page 38.

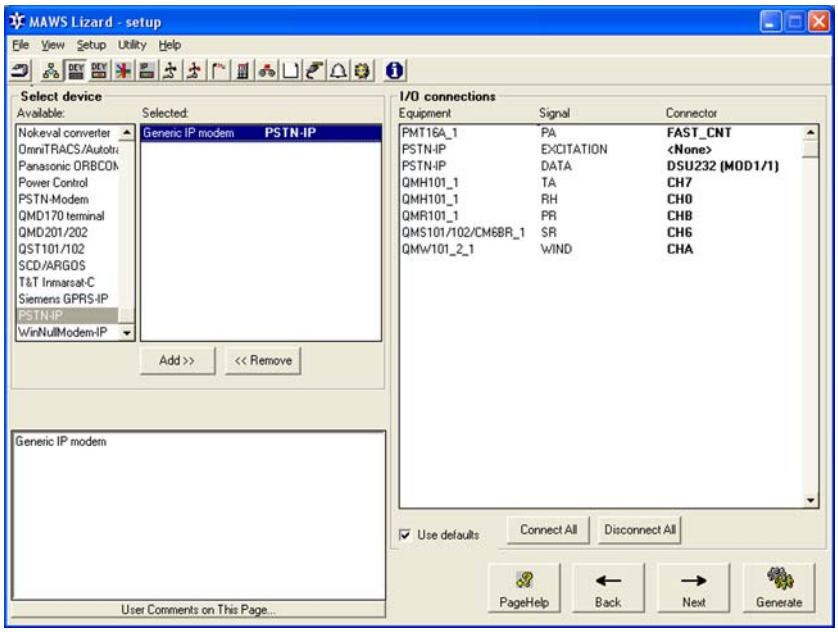

Figure 5 Devices View

Selecting Communication Devices

To select a communications device, proceed as follows:

1. Select the device to be added in the **Available** list and click **Add**.
2. In the **I/O connections** frame, select a connector for the device data and, if required, excitation signals. Note that for devices connected to optional hardware modules, you must first add the modules to your setup in the **Optional hardware** view.

Removing Communication Devices

To remove a communications device from your setup, proceed as follows:

1. Select the device to be removed in the **Selected** list. Note that if the device is used as a destination for reports, you must first disconnect the reports sent to the device in the **Communications** view.
2. Click the **Remove** button.

Device Configurations View

In the **Device configurations** view you can configure the communications devices to be included in your setup; see Figure 6 on page 39.

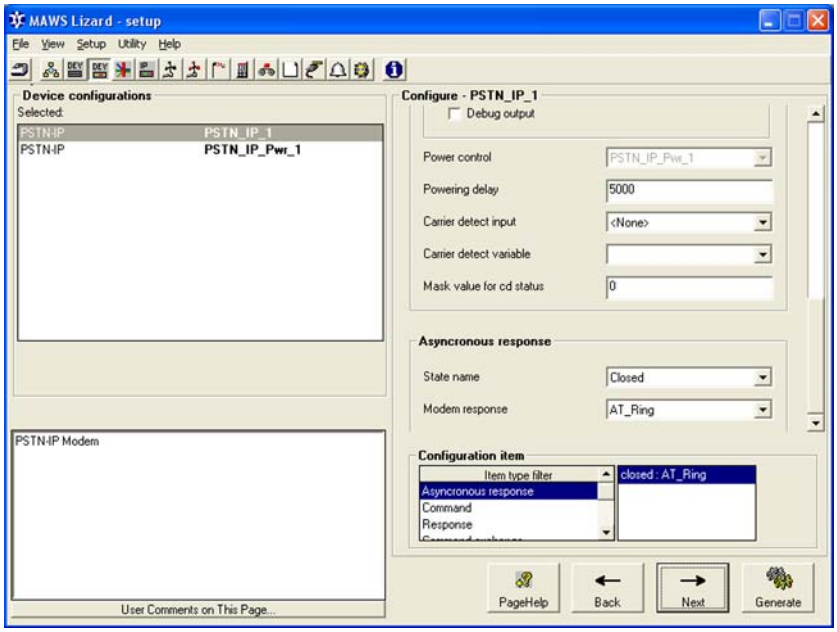

Figure 6 Device Configurations View

Non-TCP/IP Communication Devices

Regardless of the external interface used (PSTN, GSM network or other), similar interface and parameters are used for configuring the operation of the modem.

The modem control parameters are accessible in the **Device configurations** view. Reports are linked to the modem in the **Reports** view. You should link a report under **Available** reports to a communications port (**Port**) with a modem (**Device**) attached to it. Depending on the configuration, a call, SMS transmission, or Internet operation may be initiated as soon as a new report is generated. Alternatively, an inbound call and/or a poll may be required for triggering the transmission.

TCP/IP-Based Communication Devices

The TCP/IP-capable communication devices included in the list of available equipment in the **Devices** view are listed in Table 3 on page 40.

Table 3 TCP/IP Communication Devices in Lizard

Device name	Description	Use
NullModem-IP	Used to connect QML to another computer using RS232 cable. Note: this null modem does not work with a Windows PC.	Connecting the QML logger locally to a router, Linux PC, or similar devices
WinNullModem-IP	Windows-specific version of the null modem device	Connecting the QML logger locally to a Windows PC
Siemens GPRS-IP	TCP/IP connection over GSM/GPRS network using Siemens modem. Tested to work with MC35i.	Connecting the QML logger to remote systems using the GSM/ GPRS network as the ISP connection
PSTN-IP	TCP/IP connection by dialing remote modem(bank) using a PSTN modem. Tested to work with DXM421.	Connecting the QML logger to remote systems using the PSTN network as the ISP connection

NOTE All devices listed above are for IP use only. None of them provides a traditional, readable ASCII format modem connection. Non-IP modem controls must be used if ASCII operating mode is required. For configuration instructions on non-IP modems, please refer to Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 3, Configuring Telemetry Options.

Common Modem Parameters

All different IP-modem types share the same configuration view: **Device configurations**, shown in Figure 7 on page 41. This section describes the parameters for basic use. For advanced modem configuration, refer to section Configuring TCP/IP-based Telemetry in Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 3.

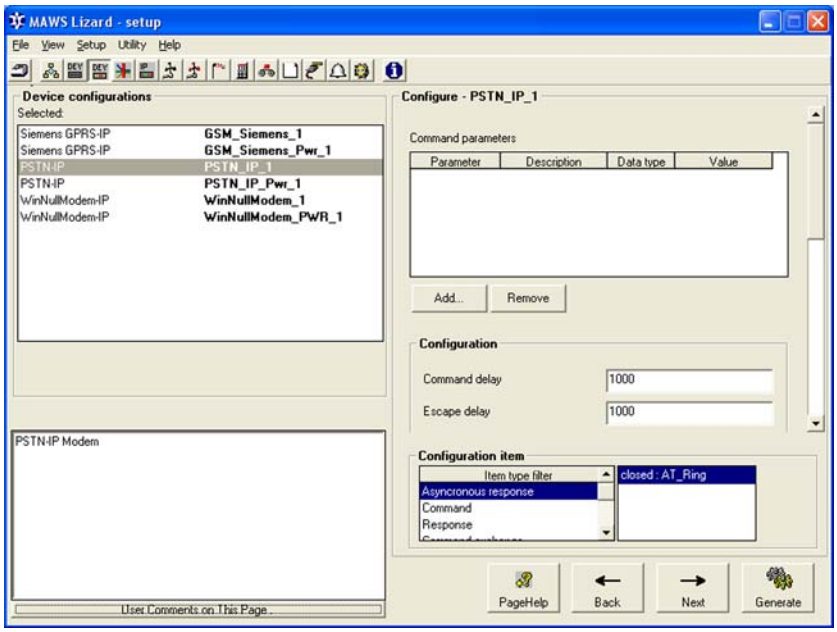

Figure 7 Modem Configuration View

The top of the view shows the parameter set values associated with the device. The parameter set and the configured component have the same name. Parameters include station specific and commissioning time settings, such as PIN codes. For certain modem types, this list may be empty. Usually there is no need to add or remove parameters, but just to change the value to an appropriate default value.

Common configuration parameters for modem controls are listed in Table 4 on page 41. All parameters may not be applicable for a certain modem type.

Table 4 Modem Control Parameters

Parameter	Use
Command delay	Delay in milliseconds between successive commands.
Escape delay	Delay in milliseconds between escape characters (+) used when closing the connection.
Dial retry count	Number of retries if opening the connection fails.
Dial retry delay	Delay in milliseconds after a failed connection attempt before attempting a new connection.
Options/Reset after failure	Use power control output to reset the device after failure.

Table 4 Modem Control Parameters

Parameter	Use
Options/Preserve power	Keep modem powered only with active connection.
Options/Answer incoming	Answer incoming calls.
Options/Debug output	Provide additional operation information to COM0.
Power control	Power control component
Powering delay	Delay in milliseconds between modem power-up and the first command.
Carrier detect input	Optional input component used to monitor the carrier detect signal from the modem.
Carrier detect variable	Variable to monitor in the carrier detect component.
Mask value for CD status	Mask logically ANDed with value of the carrier detect variable. If not set, value 0 = CD off, else CD ON.

The lowest part of the view provides an interface for managing modem commands and responses. For configuration instructions, please refer to Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 3.

Communication Interfaces View

In the **Communication interfaces** view you can configure the IP interfaces to be included in your setup; see Figure 8 on page 43.

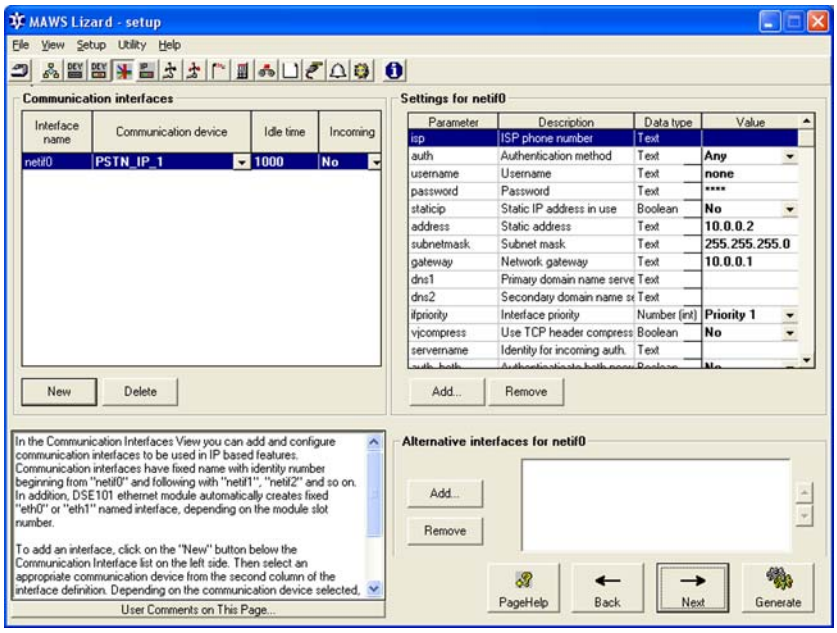

Figure 8 Communication Interfaces View

Adding Communication Interfaces

To add a communication interface, proceed as follows:

1. In the **Communications interfaces** view, click **New**. The naming for logical interfaces is fixed so that each new interface will get a name in the format **netifX**, where X is an automatically increasing interface index.
2. Select the physical communication device used by the interface.
3. Set the idle time for the device as needed by entering the value in the **Idle time** field. Idle time defines the time, in milliseconds, for which the interface is kept open when it is not being used. For example, if opening the interface is a time consuming or costly operation, it is advisable to keep it open for some time, so that all transmitted information can pass during one session.

4. Select if you want the QML logger to accept incoming connections from this interface. For interfaces using the devices **Siemens GPRS-IP** and **PSTN-IP**, you can select whether the incoming connection uses a TCP/IP-based connection or not: for TCP/IP, select the option **Yes** from the list; for connections without TCP/IP (such as data calls). select the option **Yes, without PPP**. If you select the latter option, you can use data calls, for example, for the service connection to a GPRS interface, even though the data transmission on the interface uses TCP/IP.

IP Services View

In the **IP services** view you can configure the IP services to be included in your setup; see Figure 9 on page 44.

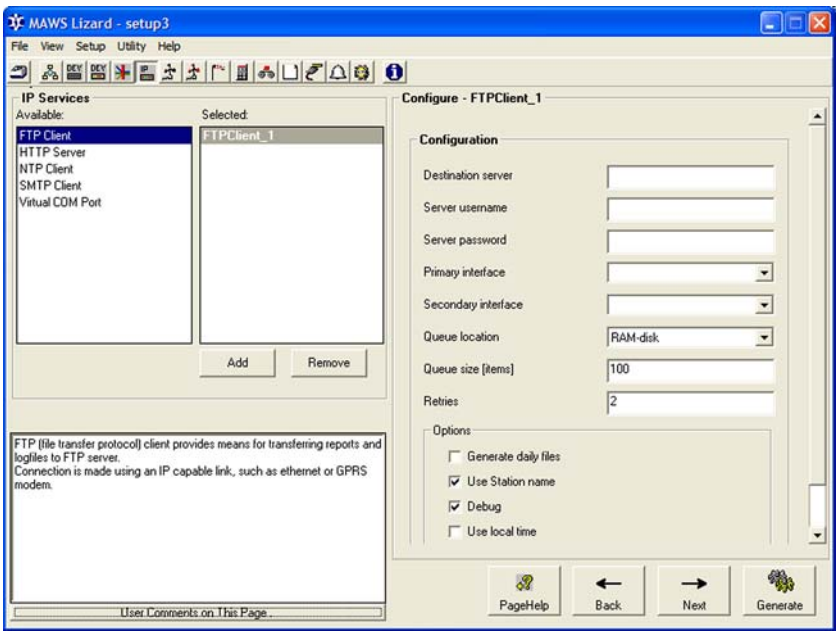

Figure 9 IP Services View

Selecting IP Services

The available TCP/IP-based services and their uses are described in Table 5 on page 45.

Table 5 TCP/IP-Based Services

Service	Use
FTP Client	Sending reports to an FTP server
HTTP Server	Displaying reports to be viewed by a browser using the HTTP protocol
NTP Client	Synchronizing the QML logger clock from an NTP server
SMTP Client	Sending reports via e-mail
Virtual COM Port	Enabling TCP/IP-based connections to the QML logger and using these for sending reports

To add an IP service to your setup, proceed as follows:

1. In the **IP services** view, select the service from the **Available** list.
2. Click the **Add** button.

For configuration instructions on each service, please refer to the Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 3.

Removing IP Services

To remove a service from the setup, proceed as follows:

1. Select the equipment to be removed by clicking on the appropriate row in the **Selected** list box.
2. Click the **Remove** button.

The service is removed from the setup.

NOTE Services other than NTP Client cannot be removed if the services are used as destinations for reports. The connections between the report and the service have to be removed in the **Communications** view first.

Equipment View

In the **Equipment** view you can select sensors to add to your setup, and assign them to certain connectors; see Figure 10 on page 46.

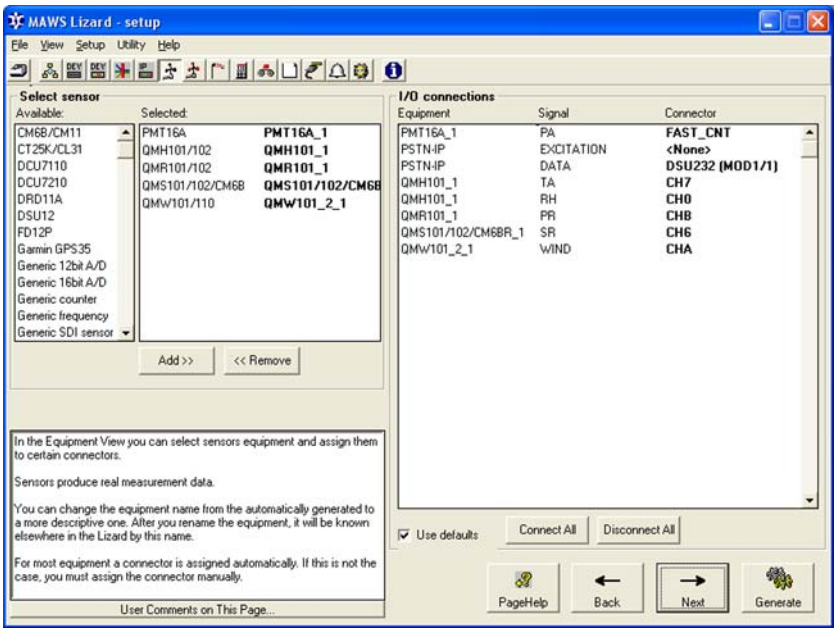

Figure 10 Equipment View

NOTE	Lizard Setup Software does not have an online connection to the QML logger when the setup is being created, and it does not know which sensors are connected to the weather station. Therefore, all sensors and their settings must be configured using this view.

For your convenience, the sensors in the basic set have default connectors assigned to them. To use the default settings, simply select the **Use defaults** check box on the lower right of the view.

Selecting Equipment

In the Equipment view, the **Select sensor** frame is divided into two list boxes. The **Available** list box contains all the available sensors or auxiliaries. The **Selected** list box contains two lists displaying both the type and name of the selected item.

To select the equipment used with the QML logger, proceed as follows:

NOTE	All equipment are not automatically assigned a connector. If this is the case, the connector has to be assigned manually, otherwise the equipment is not connected and will not show anywhere else in the setup.

1. Select the sensor to be added from the **Available** list.
2. Either drag it into the **Selected** list box, or click the **Add** button.
3. To assign connectors automatically, select the **Use Defaults** check box.
4. Each selected item is then referred to with its **type** and is assigned a unique **name** showing an identifying number. The name is automatically highlighted suggesting that it can be changed to a more descriptive one.

Removing Equipment

To remove a sensor from the setup, proceed as follows:

1. Select the equipment to be removed by clicking on the appropriate row in the **Selected** list box.
2. Click the **Remove** button.

The equipment is removed from the setup.

NOTE	Equipment cannot be removed if its measurement results have been used in calculations or reports somewhere in the setup. The measurement results have to be removed from these places first.

Assigning I/O Connections

When the sensors and auxiliary equipment have been selected, they need to be connected to the correct connectors. To make your task easier, most sensors have been assigned a default connector, which do not necessarily need to be changed.

NOTE	The connector names in the **Connector** list refer to the names on the QML logger. To physically connect equipment to the QML logger, refer to the installation instructions.

NOTE	If your system includes several sensors, the same connector may be set as default for two sensors. In these cases, you will need to modify the connector setting, and perhaps also the internal sensor wiring.

To assign connectors automatically, proceed as follows:

1. Make sure that you have selected the **Use defaults** check box before adding any equipment.
2. When a piece of equipment is added, the most commonly used sensors are automatically assigned to the connectors, which match the wiring of standard station sensors. Remember to follow this setup when installing sensors on location.

If a piece of equipment does not have a default connector, assign it manually.

To assign connectors manually, proceed as follows:

1. Double-click on the <None> text on the **Connector** list or on the connector you want to replace. A combo box appears.
2. Select the correct connector from the list.

NOTE	Some sensors, such as the QMH air temperature and humidity probe, will take up two connectors and are thus mentioned twice in the **Equipment** list of the **I/O Connections** frame.

Re-assigning Connectors

To quickly disconnect and reassign all the sensors or other equipment already connected to the QML logger channels, proceed as follows:

1. Click the **Disconnect All** button.
2. Reassign the connectors either automatically by clicking the **Connect All** button, or manually, as described in section Assigning I/O Connections on page 47.

To disconnect only one sensor, double-click the text on the **Connector** list, and select **<None>** from the combo box displayed.

NOTE	The information pane with general help information is available on all the configurable items in case you need more detailed information.

Additional Sensors View

In the **Additional sensors** view, you can select and configure the serial sensors to be included in your setup; see Figure 11 on page 49.

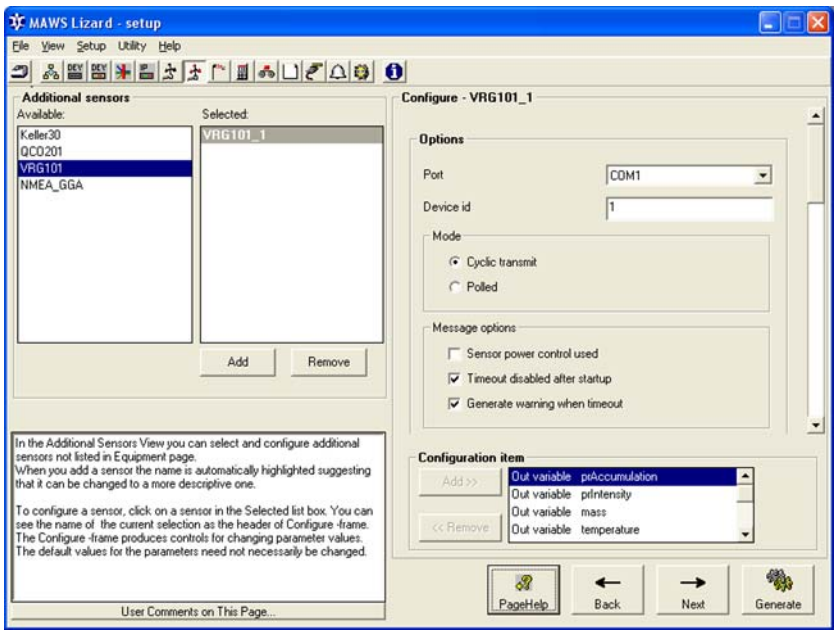

Figure 11 Additional Sensors View

Selecting Serial Sensors

To add a serial sensor or device to your setup, proceed as follows:

1. In the **Additional sensors** view, select the sensor or device from the **Available** list.
2. Click the **Add** button.

For configuration instructions on each sensor or device, please refer to the Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 3.

Removing Serial Sensors

To remove a serial sensor or device from the setup, proceed as follows:

1. Select the sensor or device to be removed by clicking on the appropriate row in the **Selected** list box.
2. Click the **Remove** button.

The sensor or device is removed from the setup.

Measurements View

In the **Measurements** view you can configure measurements for the sensors you selected and connected in the **Equipment** and **Additional sensors** views, see Figure 12 on page 51.

The basic set of sensors is automatically configured. You do not necessarily need to change the default values for the parameters. You can skip this view altogether, unless you wish to edit the measurement names or the validation parameters.

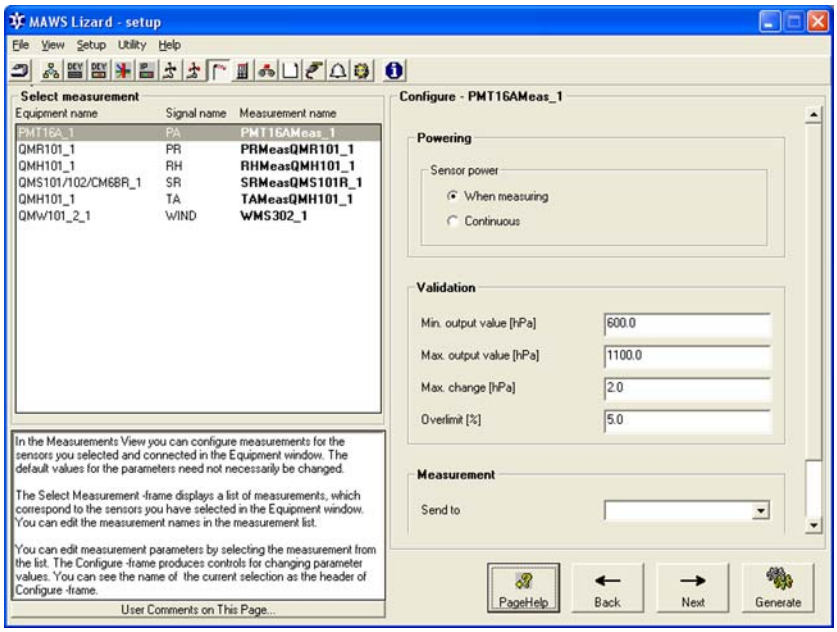

Figure 12 Measurements View

Editing Measurement Names

The **Select Measurement** frame on the upper left of the view displays a list of the equipment names, signal names, and automatically generated measurement names. The measurements shown here correspond to the sensors you have selected in the **Equipment** and **Additional sensors** view. The equipment names and signal names cannot be changed in this view. The only alteration you can make here is to change the measurement name to a more descriptive one.

To edit the measurement name, proceed as follows:

1. Double-click the name.
2. Erase the old name and type in a new one. The name is automatically saved when you press **ENTER** or click on another measurement row.

The name may consist of the following characters: A...Z, a...z, 0...9, and _. No spaces are allowed.

The measurement names used should be unique, thus no name can refer to more than one measurement in this setup.

NOTE	Since only the measurement name, instead of both the equipment name and measurement name, will be used in the setup from this point on, you are recommended to change the name to one that is meaningful to you and thus easy to remember.

Configuring Measurement Parameters

Typically, you can configure only the validation values of the parameters. These validation parameters set the limits for the measurement values. If the measurement values exceed or go under these limits, the measurements will be reported as missing.

Validation parameters include such values as the minimum and the maximum values, and the maximum change.

The basic set of sensors is automatically configured so the values in the **Configure** frame do not necessarily need to be changed.

If the **Configure** frame is empty, the measurement has no configurable parameters.

In case you have changed the parameters but want to return to the default settings, click the **Set Default** button.

NOTE	The information pane with general help information is available on all the configurable items in case you need more detailed information.

Calculations View

In the **Calculations** view you can select and configure meteorological calculations and unit conversions, as well as statistical and miscellaneous calculations; see Figure 13 on page 53.

Every calculation the QML logger makes is based on some input data. That is, when a calculation is configured, you inform the logger which variables are used for producing a particular calculation. To make this task easier, Lizard gives suggestions on the correct sources and variables. Sources can be measurement names or names of components

that manage static parameters, whereas variables are the names of the output. Sources can include one or several variables.

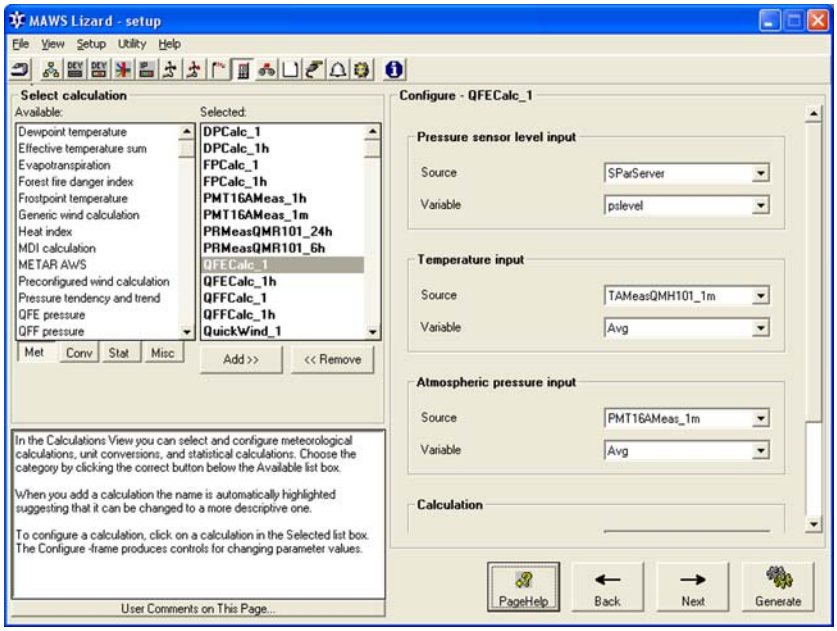

Figure 13 Calculations View

Calculation Categories

Calculations have been divided into the following four categories: meteorological calculations, unit conversions, statistical calculations, and miscellaneous calculations. The initial input data for these calculations comes from measurement algorithms, other calculations, or from static parameters.

Meteorological Calculations

In this category you are selecting and configuring calculations for derived quantities.

Some calculations, such as the wind calculation, provide two calculation options. These options include the simple, **quick** calculations that are fast to configure, and the **generic** ones that offer more possibilities but are more complex and laborious. The information pane includes more detailed information on the differences between these calculation options.

For more information on meteorological calculations, refer to the related Technical References.

Unit Conversions

All the internal calculations within the QML logger are done in SI units. With unit conversion calculations, you can convert the internally used SI units to desired units for logged or reported values. For example, you can convert hPa into mmHg.

NOTE Only SI units can be used for internal calculations. The converted values cannot be used as input values for most calculations. These values can only be used for logging and reports.

Arithmetic Operations

The conversion module also enables various arithmetic operations with one or two operands, which can be any measured, calculated, or manually entered parameters. The operations include: add, subtract, multiply, divide, square root, power, logarithm, logarithm10, exponent, absolute, sine, cosine, and tangent.

Statistical Calculations

The statistical calculations also have a selection of quick calculation sets. These quick calculation sets include:

- Quick statistic (avg, min, max),
- Quick statistic (sum), and
- Quick statistic (dev).

The different statistical functions are described in Table 6 on page 54.

Table 6 List of Available Statistical Functions

Name	Description
Avg	Average value over given calculation period
Min	Minimum value over given calculation period
Max	Maximum value over given calculation period
Sum	Sum over given calculation period
Dev	Standard deviation over given calculation period

There are also timestamps available for the minimum and maximum spans of the statistic calculation. The optional timestamps are listed in Table 7 on page 55.

Table 7 Timestamps for Statistical Calculations

Name	Description
MIN_H	Hour when the minimum was detected
MIN_M	Minute when the minimum was detected
MIN_S	Second when the minimum was detected
MAX_H	Hour when the maximum was detected
MAX_M	Minute when the maximum was detected
MAX_S	Second when the maximum was detected

NOTE The use of timestamps increases the use of the RAM memory, therefore timestamps should only be used when absolutely necessary.

Miscellaneous Calculations

Miscellaneous calculations include, for example, an accumulator option for calculating annual precipitation (see section Accumulator Calculation with Predefined Reset Time on page 59). Furthermore, you can select the Timer option to create timed events that are more freely configurable than the timers set in the **Timers** view (see section Timers View on page 100).

Setting up Calculations

To select a calculation, proceed as follows:

1. Choose between **Meteorological**, **Unit conversion**, **Statistical**, and **Miscellaneous** calculations by clicking the correct button below the **Available** list box.
2. Click on an item name in the **Available** list box.
3. Either drag it into the **Selected** list box or click the **Add** button.
4. The name of the selected calculation is automatically highlighted suggesting that it can be changed to a more descriptive one.

To configure a calculation, proceed as follows:

1. Click on a calculation in the **Selected** list box. The corresponding editable text boxes appear in the **Configure** frame.
2. Select the **Source** and the **Variable** for the parameters from the corresponding combo boxes. Only the sources and variables with suitable measurement units are shown.

NOTE If a source has only one variable option, the variable will automatically appear in the variable text box when the source is selected. If this is not the case, a variable has to be selected from the combo box.

NOTE The **Configure** frame of certain calculations, such as generic statistics, includes an extra **Configuration Item** frame as shown in Figure 14 on page 56. You can use the buttons in this frame to add and remove configurable items as an Advanced user. For further information, see section Generic Statistical Calculations on page 124.

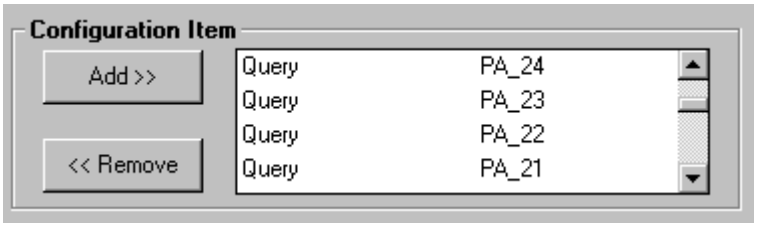

Figure 14 Configuration Item Frame

Removing Calculations

To remove a calculation from the setup, proceed as follows:

1. Select the equipment to be removed by clicking on the appropriate row in the **Selected** list box.
2. Click the **Remove** button.

The calculation is permanently removed from the setup.

NOTE The information pane with general help information is available on all the configurable items in case you need more detailed information.

Copying Calculations

The **Utility** menu contains a copy-paste feature which allow you to copy-paste calculations either inside the setup, or from one setup to another.

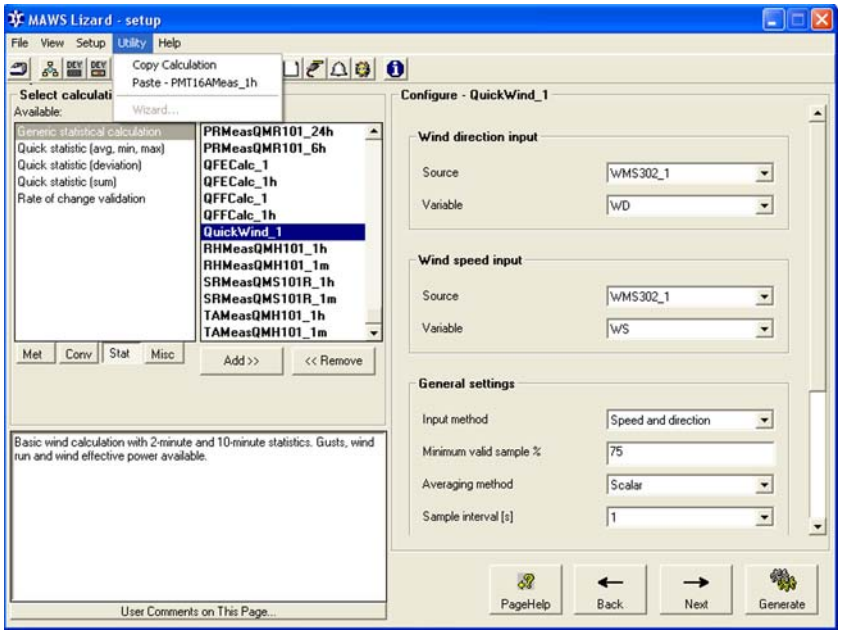

Figure 15 Utility Menu

To copy a calculation inside the setup, proceed as follows:

1. Open the calculation for editing.
2. On the **Utility** menu, select **Copy Calculation**.
3. On the **Utility** menu, select **Paste**.
4. You can rename the copy. The default name for the copy is the original name with the ending "_n" where n is a consecutive number. For example, the first copy of the calculation PMT16AMeas_24 will be named PMT16AMeas_24_1.

NOTE	When making a configuration copy inside the setup, do not close the configuration view between the **Copy** and the **Paste** commands. If you close the view, you will disconnect all variable references as explained below.

To copy a calculation from one setup to another, proceed as follows:

1. Open the calculation for editing.
2. In the **Utility** menu, select **Copy**.
3. Open the **Setup** view.
4. In the **Setup** view, open another setup or create a new setup.
5. Open the same view where you made a copy of the calculation.
6. In the **Utility** menu, select **Paste**.
7. As the latter setup does not necessarily contain the same variables, all references to the variables have been lost (that is, all variable references are empty) and you have to reconnect them. This procedure is analogous to defining the input variables for a new calculation.

Generic Wind Calculation

You can configure the sample interval of a generic wind calculation to be either 0.25 s, 0.5 s, 1 s, or 2 s. The sample interval should match the sampling rate defined for the wind sensor. For example, if you want to calculate wind with 4 Hz (250 ms) sampling, you must set the QMW101 measurement sampling rate to 250 ms (0.25 s) and the calculation sampling interval to 0.25 s (250 ms); see Figure 16 on page 58.

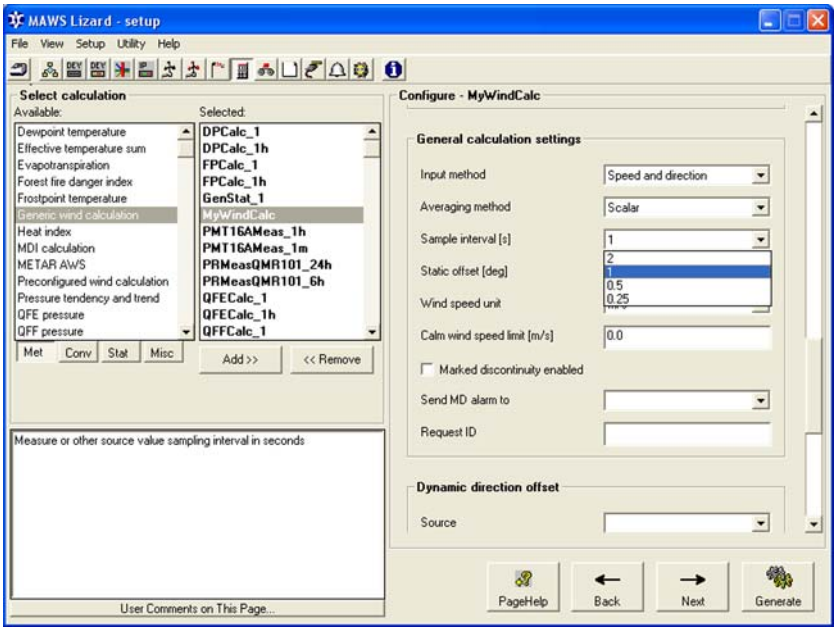

Figure 16 Calculations View: Selection of Sample Interval

Additional Parameter for Statistical Calculation

The additional parameter for statistical calculations determines whether the calculation starts only at the first complete interval. It is useful in sum calculations, where the calculation is not allowed to take place until the first complete interval begins. You must set this option if, for example, you have a daily sum of precipitation referring to midnight and you wish to calculate complete 24-hour periods only. Note, however, that in such a case you miss the precipitation sum of the first uncompleted day.

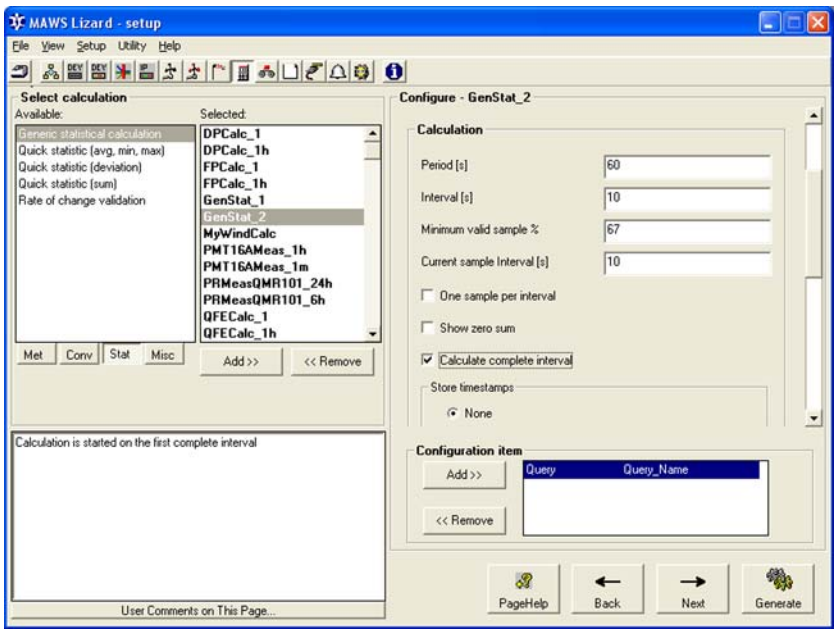

Figure 17 Calculations View: Configuring Statistical Calculation

Accumulator Calculation with Predefined Reset Time

You can use an "Accumulator" option to add a source parameter to the destination parameter in order to, for example, accumulate annual precipitation in the system and to reset the calculation at a predefined moment.

The destination parameter is stored in the static parameters to maintain its value over reset or power shutdown. In addition, the destination parameter can be reset according to a predefined schedule. The Accumulator is always incremented when the source variable is measured.

For more detailed information on how to configure the Accumulator component, see section Accumulator with Predefined Reset Time on page 158.

Logging View

In the **Logging** view you can select what kind of information the QML logger stores, as well as configure how often, in what way, and where this information is stored; see Figure 18 on page 60.

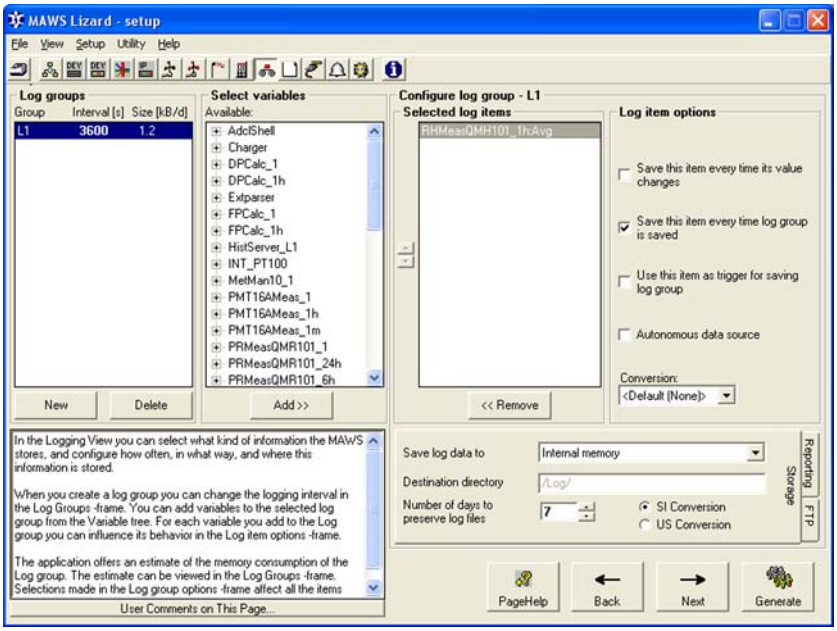

Figure 18 Logging View

The logging process consists of the following four stages:

1. Setting up log groups.
2. Selecting the items to be logged in each log group.
3. Defining when the data is to be stored.
4. Defining where the data is to be stored.

5. Defining where the data is to be sent over an FTP connection.

Data can be logged either into the logger internal memory or onto external memory cards.

NOTE	When storing (logging) data on an external memory card, the internal log memory is used as a temporary storage before transferring files to the card. Therefore, make sure that there is enough room in the internal memory for all the files generated during the course of one day.

Setting Up Log Groups

You can use log groups to group log data according to, for example, the intervals when the data is being logged. Thus one log group can contain the variables logged at one-minute intervals and so forth. Using log groups can also be useful if you define that a change in a certain variable will cause all variables in a specific log group to be logged. For example, an alarm will then trigger logging of data somehow involved with the source of the alarm.

NOTE	The QML logger uses UTC time in data logging and managing log files, not the local time.

The **Log groups** frame of the **Logging** view contains a **Group / Interval / Size** list. The **Group** list includes all the log groups that you have created. The **Interval** list displays the logging intervals, measured in seconds, of the log groups. The **Size** list contains the automatically estimated sizes of the created log groups. The sizes indicate how much log memory each group will take up daily. The size of the internal memory is approximately 1.6 MB, whereas the external memory can run up to 2 GB.

NOTE	Size information can be calculated when all items in the log group are in the form of numerical data. Otherwise the text **n/a** will be displayed in the size list.

To create a log group, proceed as follows:

1. Click the **New** button below the **Log groups** frame.

2. A log group with the next available name, starting from L0, is created. The log group names are automatically assigned by Lizard software and cannot be edited.
3. Edit the logging interval of the created log group by double-clicking on it.

Deleting Log Groups

To delete a log group from the setup, proceed as follows:

1. Select the log group to be deleted by clicking on the appropriate row in the in the **Log groups** frame.
2. Click the **Delete** button.

The log group is permanently deleted from the setup.

Selecting Log Group Items

All the items that can be selected into a log group are listed in the variable tree in the **Select Variables** frame. The items to be logged are grouped under source names like files in a directory. To see the list of items under a source, click on the plus (+) sign. To collapse the list, click on the minus (-) sign.

To select an item to a log group, proceed as follows:

1. Select the log group to which you want to add an item by clicking on the correct row in the **Log groups** frame.
2. Click on the item in the **Select variables** frame.
3. Drag the item into the **Selected log items** frame, or click the **Add** button.
4. The log item is listed in the **Selected log items** frame.

Removing Log Group Items

To remove a log group item from the setup, proceed as follows:

1. Select the log group item to be deleted by clicking on the appropriate row in the **Selected log items** frame.

2. Click the **Remove** button.

The log group item is removed from the log group.

Sorting Log Group Items

When you add items into a log group, the items appear at the bottom of the list in the **Selected Log items** frame. If you wish to sort this list, for example, to move later added items closer to the previously added ones, you can do this with the sorting buttons presented below.

To move a log group item within the **Selected log items** frame, proceed as follows:

1. Click on the row that lists the log group item to be moved.
2. Click either of the sorting buttons until the item is moved to the desired place.

Selecting Log Item Options

Table 8 on page 63 contains the possible log item options and provides information on what is logged with each option and when the logging occurs.

By default, the items are logged at a certain interval. You do not necessarily need to change this default option. If you want to change the default settings, you have to select the log item in question from the **Select Variables** frame in order to do this.

Table 8 Description of Logging Possibilities

Log Item Option	Logged Items	Logging Occurs
Save this item every time its value changes	Only the selected item(s) is (are) saved	When the selected item(s) is (are) updated
Save this item every time the log group is saved	Every item in the log group is saved	At an interval set by a timer (default)
Use this item as a trigger for saving log group	Every item (except the selected one(s)) in the log group is (are) saved	When the selected item is updated

Table 8 Description of Logging Possibilities

Log Item Option	Logged Items	Logging Occurs
Autonomous data source	Check this option only if the item to be logged is shell_log under AdcShell.	When user input is processed.

Selecting Log Group Options

You can select different log group options in the frame below the **Remove** button.

The frame is divided into two sections. The **Storage** section, which can be opened by clicking the **Storage** button on the right, contains different data saving issues. In the **Report** section, which can be opened by clicking the **Report** button, you can form reports of the log group data.

Storing Log Group Data

The QML logger has approximately 1.6 MB of internal Flash memory that can be used for logging. If you do not retrieve the data very often, and feel that the capacity of the internal memory is not sufficient, you can also use external memory cards.

Select your log destination from the **Save log data to** combo box under **Storage**. You can choose between the internal and the external memory:

- If you choose the internal memory, the option /Log/ appears by default in the **Destination directory** field below. This is the fixed internal log memory, which cannot be changed.
- If you choose the external memory, the option (sname) appears by default in the **Destination directory** field below. The value of **sname** comes from a static parameter which you can change in the **Setup** window, or, after the setup is loaded to the logger, using the AWS Client software. The value of **sname** denotes the directory on the CF card into which the log files are stored.

The QML logger stores the gathered log information in daily files by creating a daily file for each log group. The **Number of days to preserve log files** option determines how many days these daily log files are kept in the internal memory before they are automatically

deleted. You can also turn off this option, in which case the log files are stored until the log memory is full.

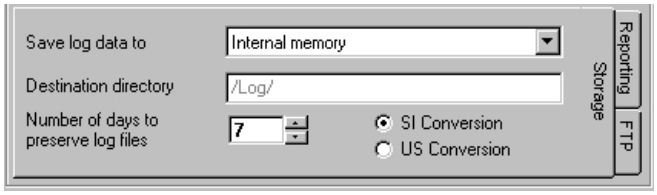

Figure 19 Log Group Options: Storage Section

Reporting Log Group Data

In the **Reporting** section, you can form time history tables of the log group data to send out as reports. Note that if your QML logger software version is lower than 3.02, the report section will be disabled and you cannot access it.

When you start formatting a log group report all the boxes in the frame will be empty. To format the report, proceed as follows:

1. In the **Log Groups** frame, select the log group for which the report is.
2. Click the **Reporting** tab.
3. From the **Type** combo box, select the kind of report you wish to form. You can form either scan or channel ordered reports; see section Log Group Report Types on page 66.
4. The value in the **Records** box indicates how many log records will be included in the report. One record contains the log group data stored at particular moment in time. Selecting 1 creates a report containing only the most recent record, 2 the two most recent ones, and so on. For example, if the log group has hourly records, the report is sent at 06:00 hours, and the **Records** value is 6, the reports will include logged data from 06:00, 05:00, 04:00, 03:00, 02:00, and 01:00 hours.

   The **Records** value is connected to the **Interval** in the **Log groups** frame.
5. Click the **Default** button. A default format string appears in the **Format** text box. The format string is described in section Format String on page 67.

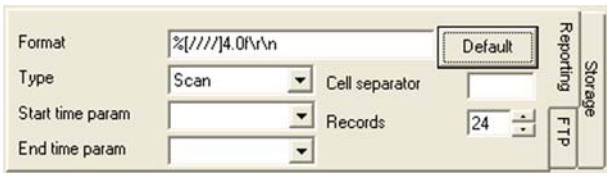

Figure 20 Group Options: Report Section

Log Group Report Types

You can form two types of log group reports: scan ordered reports and channel ordered reports. The difference between the reports is in the way they present information.

Scan Ordered Reports

In scan ordered reports the data is presented in the following way:

```
19.8  42 1031.6  201   2.0
20.3  44 1030.8  264   1.8
20.4  40 1030.1  258   1.6
20.7  39 1029.7  221   1.3
21.2  37 1029.5  211   1.7
```

In a scan ordered report table, the measured items are organized in columns, in such a way that one column consists of the measurements of one item over a period of time. Oldest values appear in the first row, and the most recent ones in the last.

Channel Ordered Reports

In channel ordered reports the data is presented in the following way:

```
19.8  20.3  20.4  20.7  21.2
42  44  40  39  37
1031.6 1030.8 1030.1 1029.7 1029.5
201 264 258 221 211
2.0  1.8  1.6  1.3  1.7
```

In a channel ordered report table, the measured items are organized in rows, in such a way that one row consists of the measurements of one item over a period of time.

Format String

The format of the log group report is defined by a default string that follows the syntax of the C programming language with certain extensions.

An example of a default format string is presented below, with a description of its different parts.

%[//////]6.1f%[//////]6.1f%[//////]5d (...)

where

%	=	Starts the field
[ ]	=	Contain the characters for invalid data, for example, ////// or missing
6	=	Indicates field width (number of characters)
.1	=	Indicates the number of decimals
f	=	Ends the field (of a decimal number)
d	=	Ends the field (of an integer number)

By default, the fields of the format string are separated by a space.

Sending Log Group Data over an FTP Connection

You can specify that the log group you are creating is regularly sent to a remote server over an FTP connection. This assumes that you have an FTP server available to receive log data, and that you have specified one or more FTP clients in your QML logger setup file. For information on how to configure FTP clients in the setup, see Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 3.

It is useful to have multiple FTP clients specified the logger setup. For instance, if you have only one client, and you use it to send both log files, which tend to be large, and reports, which are smaller in size, an error in sending the log file would block sending the report as well. However, if you use one client to send logs and another to send reports, the report might still get through even if sending the log had failed.

To specify an FTP connection for a log group, proceed as follows:

1. In the **Log Groups** frame, select the log group for which you wish to define an FTP connection.
2. Click the **FTP** tab.
3. From the **Select FTP client** drop-down menu, select the client you wish to use for the connection.
4. In the **Destination directory** text field, enter the directory on the FTP server in which you wish to have your log group stored. Note that you only need to enter the directory name; you specified the server name in **IP Services** the when you created the FTP client for the setup.

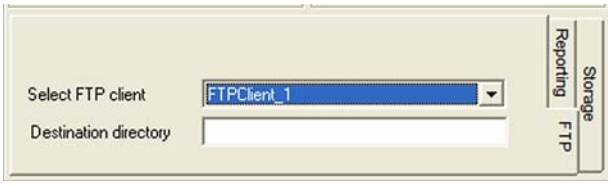

Figure 21 Group Options: FTP Connection

Sending Log Group Reports

The created log group reports cannot be sent in the **Logging** view, instead they are sent in the **Reports** view like other reports.

To send a log group report, set up a StringForm report, and select the log report file as one of the variables of the report. See Figure 22 on page 69. The preview function is not available with log group reports.

For further information on setting up and sending reports, see section Reports View on page 71.

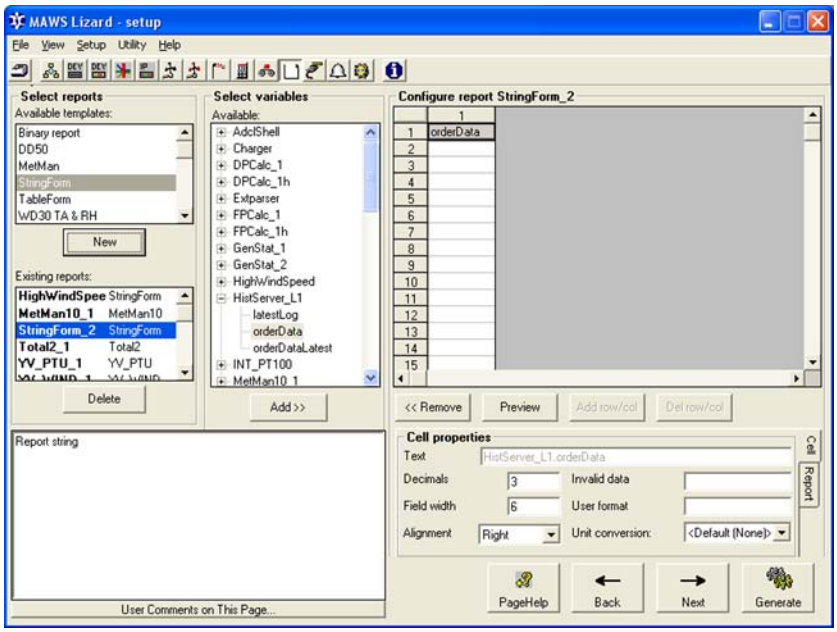

Figure 22 Reports View Showing a Log Group Report

NOTE	If you are creating log group reports with setups from earlier Lizard versions, you must delete the log groups and set them up again, for this function to work.

NOTE	The information pane with general help information is available on all the configurable items in case you need more detailed information.

Unit Conversion in Logging

All internal calculations in the QML logger are done in SI units. However, you can convert measured or calculated values to another unit before storing data into the log memory. Typically, these conversions are made from an SI unit to a US unit, for example from meters per second to miles per hour. There are several predefined conversions you can select from the list. Only those specified for each unit are displayed. For example, there is no conversion from Celsius to knots. In addition, only those values can be converted whose unit is known. In most cases of predefined sensors, Lizard knows the unit. For manual sensors and generic sensors, you have to specify the unit manually. See section Setting Unit and Conversion for Manual Sensors on page 129.

If you download a log file from the QML logger and convert it to a *.csv* file, only the converted values can be seen in this file.

In order to make a conversion, select a Log item. Then select the unit from the conversions available for that item in the **Conversion** list of the **Log item options** frame. For example, in Figure 23 on page 70, a Celsius to Fahrenheit conversion for a temperature measurement has been selected.

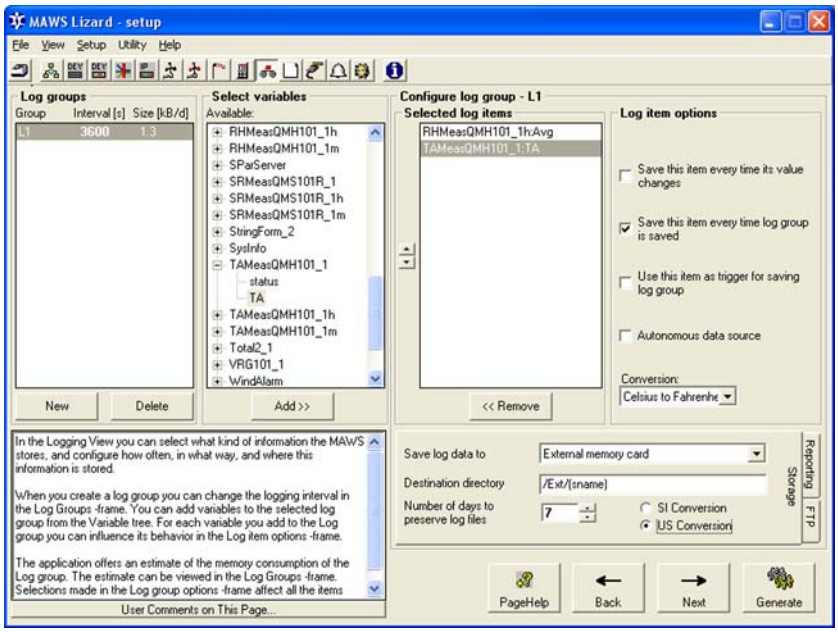

Figure 23 Logging View: Unit Conversion

Using External Memory Cards

The size of the external memory cards, or, Compact Flash cards, supported by the QML logger ranges from 32 MB to 2 GB. Vaisala offers 32 and 256 MB cards as a standard option. You are recommended to only use cards purchased from Vaisala that have been tested to function in harsh environments.

NOTE	If the Compact Flash memory card has not been formatted, it must be formatted before use. In MAWS versions 6.00 and later, you are recommended to format the card in a Windows PC. The file system to use is FAT (not FAT32). Also, do not select the quick format option. To format the CF card in the QML logger, insert it into the CF slot of the QML logger. Give the **EXTFS** *ERASE* command. After the card has been formatted, you can remove it from the slot.

The external log memory acts as a storage for data that has been copied or moved from the internal memory. The copying or moving is carried out once a day, 30 seconds after midnight. Once the data has been moved from the internal memory to the external memory card, no log group reports can be sent from this data.

Automatic Erase for Compact Flash Card

The log group specific setting **Number of days to preserve log files** affects also the files stored to the external Compact Flash card. The functionality is the same as for internal log memory, that is,

- Files older than the selected value [days] are deleted automatically
- Files are not erased, that is, the automatic clean up is disabled

When files are stored to the external card, the internal memory is used as the working memory for storing the log files of the current day. These working files are moved to the external card each day just after midnight when the new files have been opened for writing.

Reports View

In the **Reports** view you can create, format, and manage reports that contain text, measurement values, and calculated data; see Figure 24 on page 72.

With Lizard Setup Software you can create two basic types of reports, table form (TableForm) and string form (StringForm) reports. Both of these types are based on specific report templates. The table form template is the best choice when you want to create a table-like report, whereas string form offers you more freedom for formatting. Lizard

software also offers some preformatted report templates for complex reports.

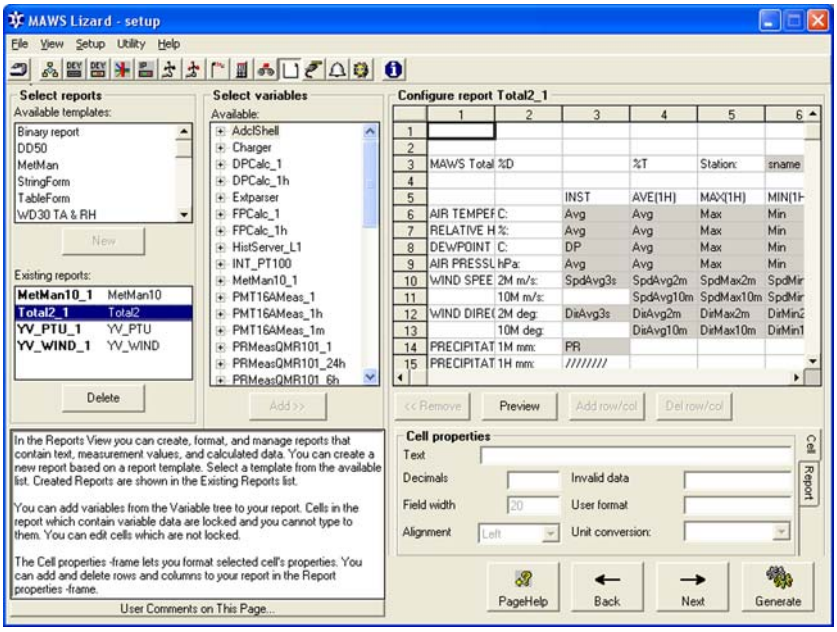

Figure 24 Reports View Showing a TableForm Report

Report Templates

Lizard Setup Software provides two types of report templates: the table form (TableForm) template and the string form (StringForm) template. The table form and string form reports resulting from these templates are different in appearance. They are also formed in a different way, and used for different purposes. Lizard also offers a few preformatted report templates to make the creation of some complex reports easier.

NOTE	In early Lizard Setup Software versions, the StringForm template is called a FreeForm template and TableForm template is called a TabularForm template.

TableForm Report

The TableForm report is most suitable for human viewing. This is a table-like report consisting of several columns and rows with explanatory headings. An example of a table form report is shown in Figure 24 on page 72.

StringForm Report

The StringForm report is most suitable for transferring information between computer systems. To make the editing of StringForm reports easier, the report appears as a single column in the **Configure report** frame. Depending on the settings, however, the final report is usually displayed as a row or several rows. The StringForm report may include a column heading but it has no row headings. An example of a StringForm report is shown in Figure 25 on page 74.

Preformatted Report

In order to make the creation of some complex but frequently used reports easier, Lizard provides the preformatted report templates listed in Table 9 on page 73.

For instructions on how to edit or fill out these preformatted reports, see section Adding Preformatted Reports on page 83.

Table 9 Report Templates

Template	Use
DD50	Sends PTU, wind, and precipitation data to the DD50 Digital Display
MetMan	Sends user selectable variables to MetMan software
WD30 Wind	Sends instant wind data to the WIND30 display
WD30 TA & RH	Sends temperature and humidity data to the WIND30 display
YourView wind	Sends instant wind data to the YourView display software
YourView PTU	Sends PTU, radiation, and precipitation data to the YourView display software
Custom report	Facilitates the creation of special-formatted reports, for instance, HTML-form reports.

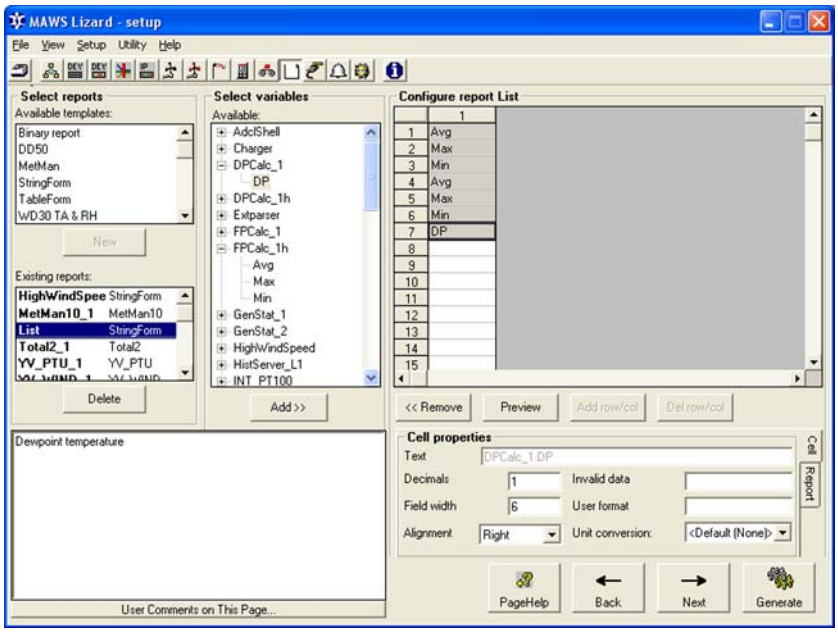

Figure 25 Reports View Showing a StringForm Report

Setting up a Report

To create a new report, proceed as follows:

1. Choose either the **TableForm** or **StringForm** option from the **Available** templates list box by clicking on it.
2. Click the **New** button.
3. A new report appears in the **Existing reports** list box. If necessary, you can change the automatically assigned report name to a more descriptive one by double-clicking on it.
4. The blank **Configure report** frame on the right of the view can now be filled out.

NOTE	You cannot switch the report template while creating or configuring a report, but you can delete the current report and start a new one.

To edit an existing report, proceed as follows:

1. Select the report from the **Existing reports** list box by clicking on it.
2. The selected report appears on the right of the view ready to be edited.

Deleting a Report

To delete a report from the setup, proceed as follows:

1. Select the report to be deleted by clicking on the appropriate row in the **Existing reports** list box.
2. Click the **Delete** button.

The report is permanently deleted from the setup.

Filling out Reports

At least in case of table form reports, filling them out can include two different tasks: inserting explanatory column and row headings into the table, and selecting the necessary variables for the report. To see what the configured report looks like, click the **Preview** button.

Inserting Text into a Report

To create a proper table form report, you should enter both text and variables into the **Configure report** frame. However, you cannot insert them both in the same cell. To see the structure of an ordinary table form report, refer to Figure 24 on page 72.

To insert text into a cell, proceed as follows:

1. Click on the cell in which you wish to insert text. A cursor appears in the **Text** text box of the **Cell properties** frame.
2. Enter your text, for example, a column or a row heading. The text you insert will also appear in the selected cell.

Selecting Variables for a Report

All the items that can be placed in a report are listed in the variable tree in the **Select Variables** frame. The items are grouped under source names like files in directories. To see the list of items under a source, click on the plus (+) sign. To collapse the list, click on the minus (-) sign.

To select an item to a report, proceed as follows:

1. Select the item to be added to a report by clicking on it in the **Select variables** frame.
2. Either drag the item into a cell in the **Configure report** frame, or select a cell, and click the **Add** button.
3. The item is shown in a report cell.

The list of variables also includes items such as time and date, and special characters such as <SOH> Start of Heading and <STX> Start of Text. You can select these items from the variable tree under the source name **Reporting**. These items do not take up a cell of their own, but are added into an already filled cell, next to an existing text.

NOTE	The special characters in a report preview are often indicated by a backslash preceding the character.

Removing Variables from a Report

To remove a variable from a report:

1. Select a cell with the variable to be removed from the **Configure report** frame.
2. Click the **Remove** button.

The variable is removed from the report.

Editing Reports

You can edit cells and reports in the **Cell properties** and **Report properties** frame. The properties can be viewed alternatively by clicking the corresponding buttons below the frame.

Editing Cell Properties

NOTE	Most text boxes in the **Cell properties** frame have default values which you do not necessarily need to change.

The **Cell properties** tab includes six text boxes.

The **Text** text box displays the text in the selected cell. Text marked with gray, such as the variables, cannot be edited.

The **Decimals** text box displays the amount of decimals determined by the variable in the selected cell. Correspondingly, the width of the cell shown in **Field width** is determined by the widest variable.

The **Alignment** drop-down menu enables you to select whether the data in the cell is aligned right (default), left, or centered.

In the **Invalid data** text box, you can enter the characters used to indicate invalid data such as missing measurement results.

NOTE	The format setting in the **User format** overrides all other format settings for the selected cell, and it is available only in the Advanced user level.

You can make a unit conversion by selecting from the **Conversion** combo box. For more information on unit conversions, refer to section Unit Conversion in Reports on page 79.

To edit cells, you should first select the cell to be edited. To change the width of the cells, you need to select the entire column by clicking the gray number cell above the column.

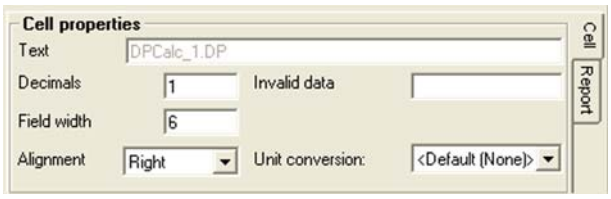

Figure 26 Editing Cell Properties

Editing Report Properties

The **Report properties** tab includes two text boxes. The **Cell separator** text box indicates what kind of character is used as the column separator. Normally it is the tabulator, marked \t. The **Invalid data indicator** text box displays the character used to indicate invalid data, for example a slash. This character is user-definable.

The **SI Conversion** radio button, if selected, causes no conversion to be performed on the selected cell; this is the default. The **US Conversion** radio button, if selected, causes the conversion predefined for the measurement unit in the selected cell to be performed. In Wizard 6.01, the US Conversion option supports one conversion, the Kelvin-to-Celsius conversion.

For information on checksums, see section Checksum Option in Reports on page 166.

On Advanced user level, the **Report properties** frame also includes an extra combo box. The **Report formatting** combo box offers choices for automatic report formatting, in other words, options for packaging or compressing reports. For further information, see Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 2.

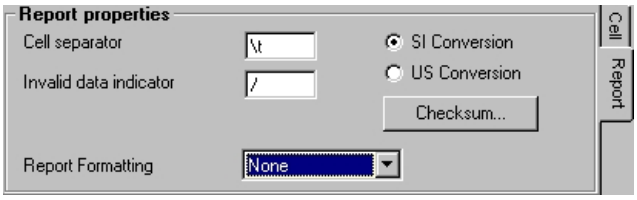

Figure 27 Editing Report Properties

Adding Rows or Columns

The **Add row/col** button, under the **Configure report** frame, enables you to add rows and columns.

To add rows or columns, proceed as follows:

1. Select a column or a row in front of which you want to add a new one by clicking the gray number cell above the column or on the left of the row. The **Add row/col** button is enabled and changes into either an **Add row** or **Add column** button, depending on which element you have selected.
2. Click the **Add row** or the **Add column** button. A new row or column appears in front of the existing one.

Removing Rows or Columns

The **Del row/col** button, under the **Configure report** frame, enables you to the delete rows and columns.

To delete rows or columns, proceed as follows:

1. Select the column or row to be removed by clicking the gray number cell above the column or on the left of the row. The **Del row/col** button is enabled and changes into either a **Del row** or **Del column** button, depending on which element you have selected.
2. Click the **Del row** or the **Del column** button. The row or column is deleted.

NOTE	The information pane with general help information is available on all the configurable items in case you need more detailed information.

Unit Conversion in Reports

All the internal calculations in the QML logger are done in SI units. However, you can convert measured or calculated values into another unit before storing data into the log memory. Typically, these conversions are made from an SI unit to a US unit, for example from meters per second to miles per hour. There are several predefined conversions that you can select from the list. Only those specified for each unit are displayed. For example, there is no conversion from

Celsius to knots. In addition, only those values can be converted whose unit is known. In most cases of predefined sensors, Lizard knows the unit. For manual sensors and generic sensors, you have to specify the unit manually.

In order to make a conversion, select a variable. Then select the unit from the conversions available for that item in the **Unit conversion** list of the **Cell properties** frame. In the example Figure 28 on page 80 a meters/s to mph conversion has been selected.

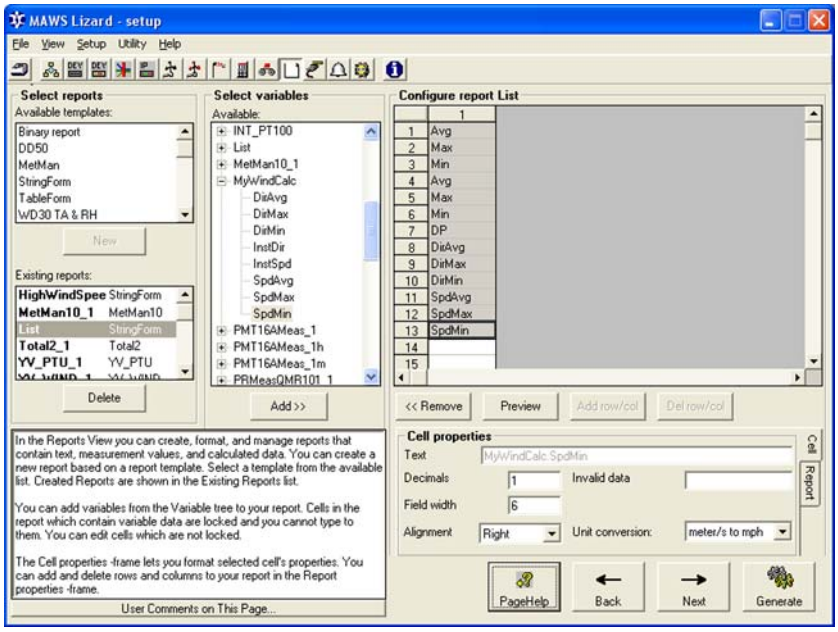

Figure 28 Reports View: Unit Conversion for the Reported Value

Status Conversion in Reports

The status conversion component shows the status of the data items in textual format other than the default text, for example in another language. The textual status can be included, for example, in a report. This component is configured in the **Calculations** view as shown in Figure 29 on page 81.

The default status info is shown in the column on the left under **Status strings**. You can change the status strings by editing the text fields in the column on the right. When a conversion is made, the QML logger

checks the original statuses from bottom to top. Only one status string is present at a time.

To configure a new conversion, proceed as follows:

1. Go to the **Calculations** view and click the **Conv** button.
2. Select *Value status to string converter* from the **Available** list in the **Select calculation** frame and click the **Add** button.
3. Enter the new status string to replace the default status; see Figure 29 on page 81.

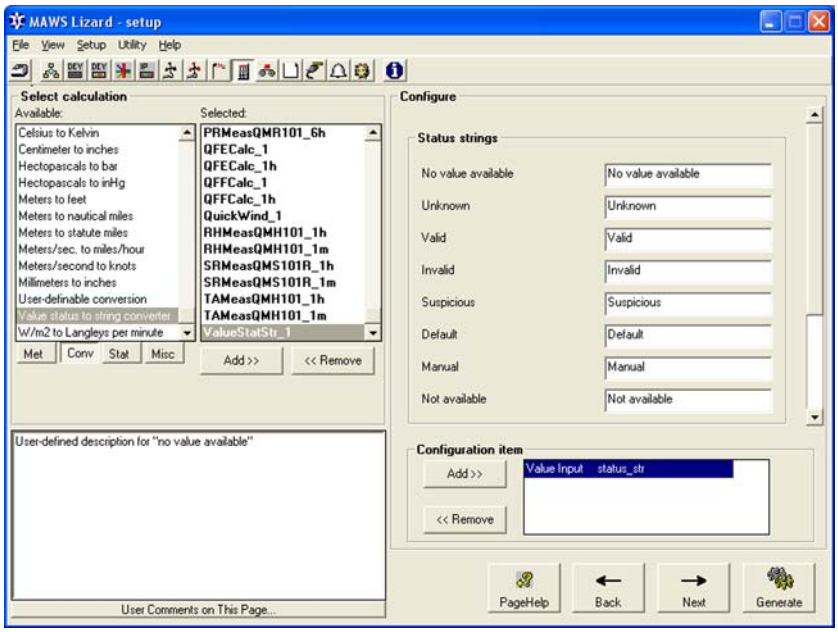

Figure 29 Calculations View: Configuring Status Strings (1/2)

Some of the status strings listed in Table 10 on page 81 can be present concurrently, for example, **Manual** and **Valid**.

Table 10 Fields under Status Strings

Status String Field	Description
No value available	Unable to retrieve status
Unknown	No valid status
Valid	Status of the retrieved data item is valid
Invalid	Status of the retrieved data item is invalid
Suspicious	Value of the data is suspicious (probably OK)
Default	Data item has the default value
Manual	Data item is set manually
Not available	Typically, the data item is not yet measured

You can ignore some of the statuses by leaving the field empty.

4. Select the data item to which the status conversion applies by selecting a source and a variable in the **Value input** frame; see Figure 30 on page 82. If you want the same conversion to apply to other data items as well, click the **Add** button to add the rest of the data items.

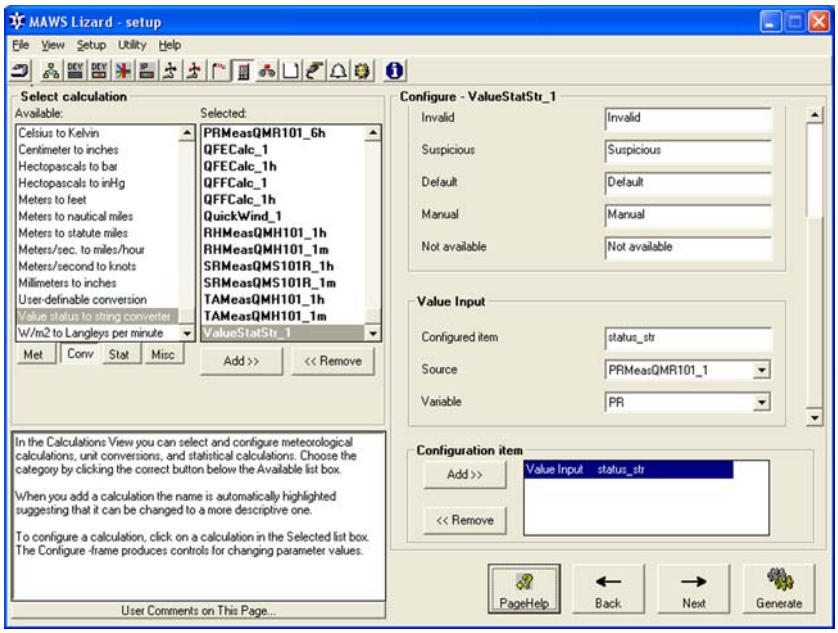

Figure 30 Calculations View: Configuring Status Strings (2/2)

If another status conversion with different status strings is required, repeat the steps above.

To add the previous status string in a report, proceed as follows:

1. Create a report.
2. When the status string is needed, select **status_str** from the **Available** list as shown in Figure 31 on page 83. The **status_str** field is created for a report.

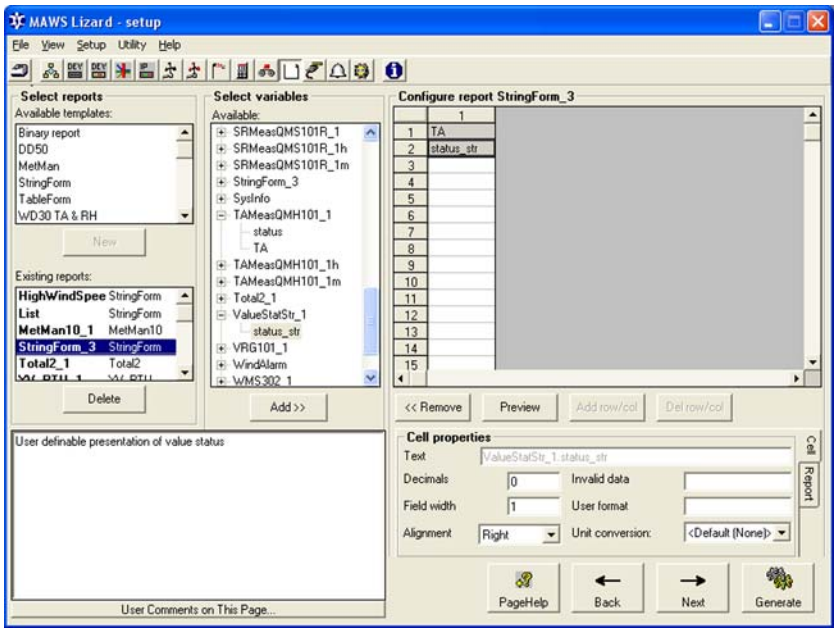

Figure 31 Reports View: Selecting status_str to a Report

Adding Preformatted Reports

To add a report based on a preformatted template into your setup, proceed as follows:

1. Open the **Reports** view.
2. In the **Select reports** frame, select the desired preformatted template from the **Available templates** list, and click **New**. See Figure 32 on page 84.

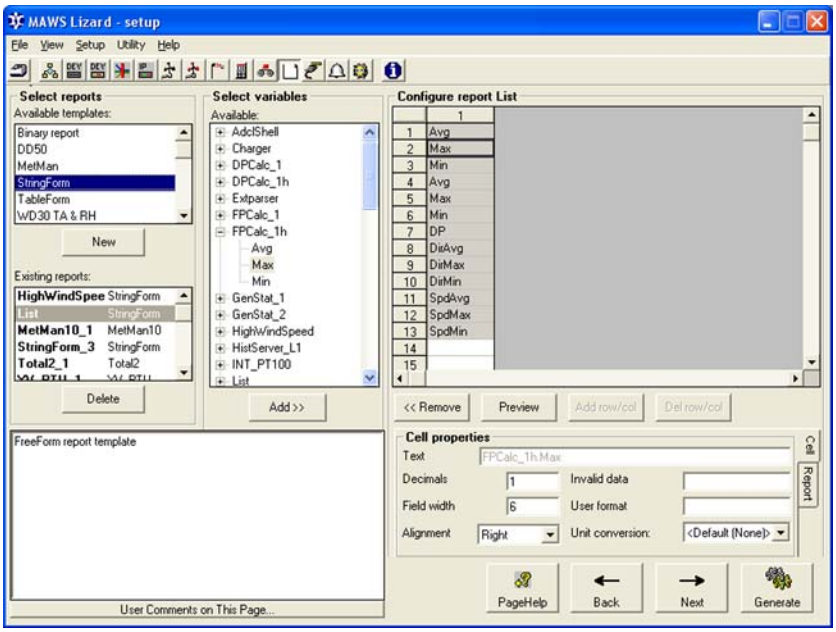

Figure 32 Reports View: Available Templates

3. See Figure 33 on page 85 for the contents that appear in the **Configure report** frame. A preformatted report initially has no actual variables linked to it. Cells to which the variables should be placed are indicated by tags, that is, variable abbreviations enclosed in square brackets, for example, **[TA]** and **[RH]**. In the information pane, the report information lists the required variables for the tagged cells. You can retrieve the list by clicking the report in the **Existing reports** list or by clicking the original template in the **Available templates** list.

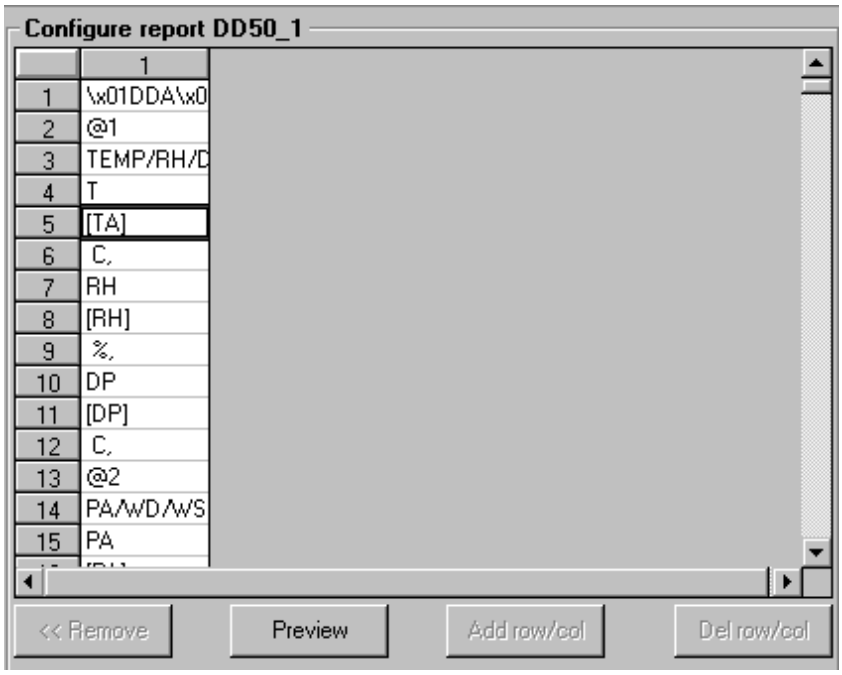

Figure 33 Preformatted Report Template with Tags

4. Replace all listed tags with the actual variables by selecting the desired cell from the report, and by selecting an item from the **Available** list in the **Select Variables** frame and drag and dropping it to the cell with the mouse or by clicking the **Add** button. See Figure 32 on page 84 for an example of the predetermined report with the actual variables. You may enter a fixed text in a tagged cell, if your setup does not produce the required data. However, note the capabilities of the device to which the report is sent, for example, you cannot use slash characters "/" with a device that has 7-segment display elements.

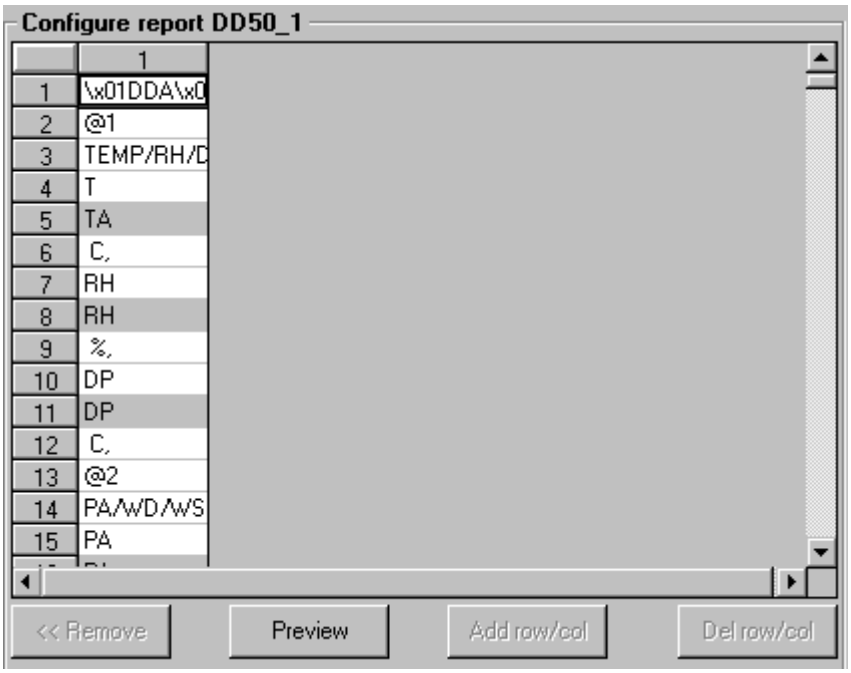

Figure 34 Preformatted Report with Variables

NOTE	Only modify the tagged cells. Do not modify any other cells. Also, preserve the cell attributes, for example, the width and the number of decimals while adding the variables or a fixed text to the report. Some display devices or programs may start displaying erroneous or partial data when, for example, the total or field length of the report is not correct.

NOTE	If you change a preformatted report created from a template by typing text or by changing attributes of a variable cell, the message displayed in Figure 35 on page 87 appears. It means that Lizard will no longer try to preserve the original attributes for the report. For example, if you replace a tagged cell content with a variable after getting this message, the default variable dependent field width and number of decimals will be used instead of those that came with the report.

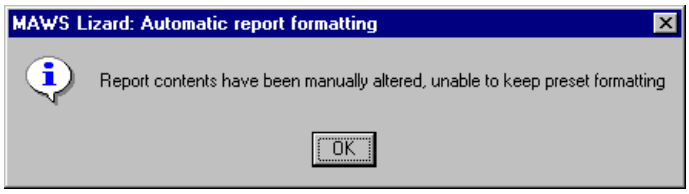

Figure 35 Automatic Report Formatting Message

5. Open the **Communications** view and link the report to an output device. Do not insert any headers or trailers other than the default trailer "\r\n".

Copying Reports

The **Utility** menu contains a copy-paste feature which allows you to copy-paste reports either inside a setup, or from one setup to another.

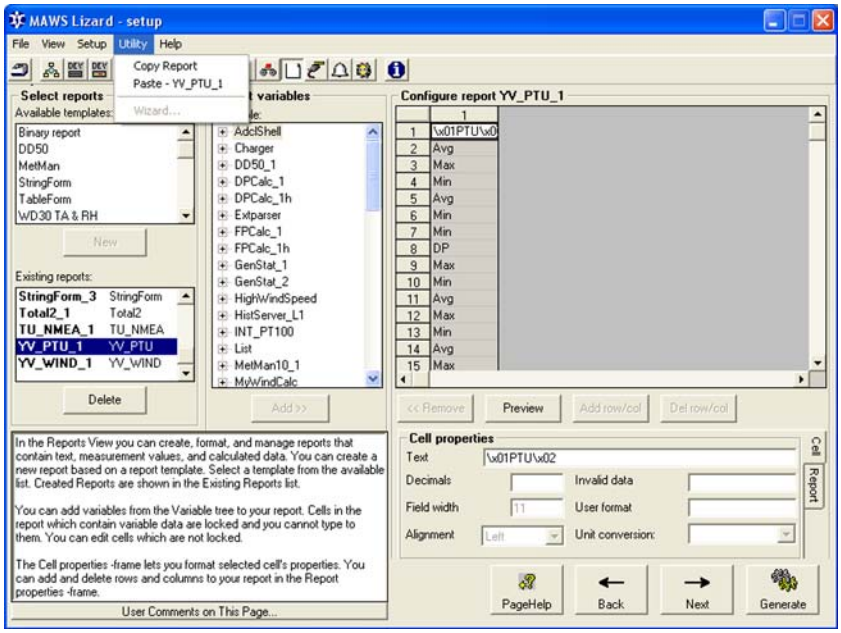

Figure 36 Utility Menu

To copy a report inside the setup, proceed as follows:

1. Open the report for editing.
2. In the **Utility** menu, select **Copy**.
3. From the **Utility** menu, choose **Paste**.

4. You can rename the copy. The default name for the copy is the original name with the ending "_n", where n is a consecutive number. For example, the first copy of the report Total will be named *Total_1*.

NOTE When making a configuration copy inside the setup, do not close the configuration view between the **Copy** and **Paste** commands. If you close the view, you will disconnect all variable references as explained below.

To copy a report from one setup to another, proceed as follows:

1. Open the report for editing.
2. From the **Utility** menu, choose **Copy**.
3. Open the **Setup** view.
4. In the **Setup** view, open another setup or create a new one.
5. Open the same view where the copy was made in.
6. From the **Utility** menu, choose **Paste**.
7. As the latter setup does not necessarily contain the same variables, all references to the variables will be lost and you have to reconnect them. This procedure is analogous to defining the input variables for a new report.

   The variables are replaced with tags. The variable tags are constructed similarly to predetermined reports, that is, a variable name is enclosed in square brackets, for example, [TA1m_Avg]. The reports also keep their original attributes, such as the column width, unless manually changed.

NOTE If you change a preformatted report copied from a template by typing text or by changing the attributes of a variable cell, the message displayed in Figure 35 on page 87 appears. It means that Lizard will no longer try to preserve the original attributes for the report. For example, if you replace a tagged cell content with a variable after getting this message, the default variable dependent field width and number of decimals will be used instead of those that came with the report.

Checksum Option in Reports

You can add a checksum into a report that is already in the report configuration. You can also define where the data begins and ends in the checksum calculation as well as format the checksum fields to meet your own requirements. For detailed information on the checksum option and on how to create a checksum report, see section Checksum Option in Reports on page 166.

Binary Report

You can also create binary reports, that is, reports where data is stored as binary instead of visible ASCII characters. It is also possible to pack data so that one data item uses only a limited number of bits. For detailed information on creating binary reports, see section Binary Report on page 170.

Communications View

In the **Communications** view you can define where and how reports are sent; see Figure 37 on page 90.

Reports can be sent either automatically using timers, or they can be polled, or both. One report can be sent to more than one communication port, and one communication port can transmit more than one report.

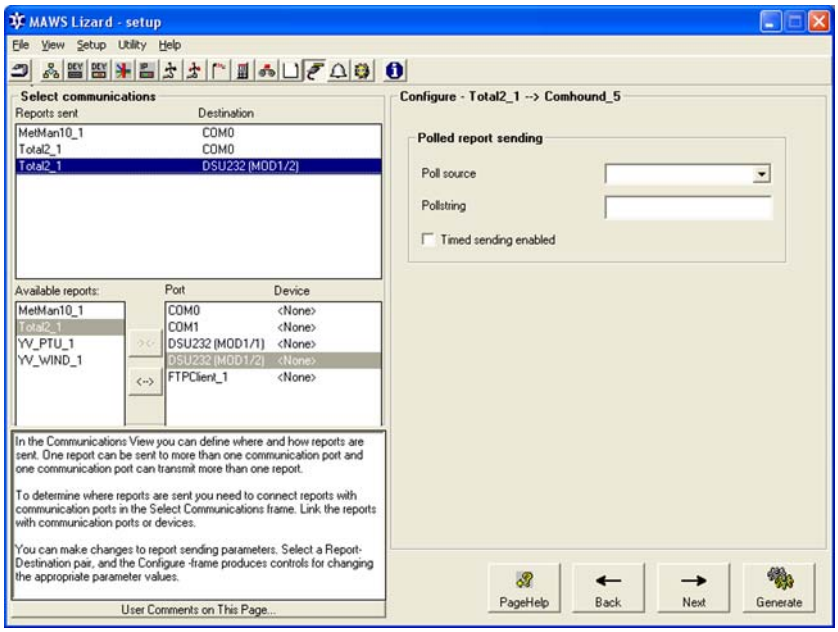

Figure 37 Communications View

Connecting Reports to Communication Ports

To determine where reports are sent, you need to connect reports to communication ports in the **Select Communications** frame.

The **Select Communications** frame is divided into three list boxes. When you first start setting up communications, the uppermost **Reports sent / Destination** list box is empty. The **Available reports** list box provides a list of all the created reports. The adjacent **Port / Device** list box lists the different communication ports and the devices that were connected to them in the **Equipment** and **Devices** view. This serves as a reminder of which ports are already taken up and which are still available. Reports can also be sent to virtual COM ports; for details on virtual COM ports and using them with reports, please refer to the Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 3.

To connect reports to communication ports, proceed as follows:

1. Select the report from **Available reports** list box by clicking on it.
2. Select the port you want to send it through by clicking on the desired row in the **Port / Device** list box.
3. Click the linking button.
4. The linked report-port pair appears in the **Reports sent / Destination** list box. A corresponding **Configure** frame also appears on the left of the view.

Lizard Setup Software makes a distinction between communication ports and devices. Ordinarily, only the communication port through which the report is sent is listed under **Destination**. However, if the final destination is an actual device controlled by the QML logger, then the name of the device is displayed under **Destination** instead of the communication port.

Disconnecting Reports from Communication Ports

To disconnect reports from communication ports, proceed as follows:

1. Select the desired row from the **Reports sent / Destination** list box. The corresponding rows in the **Available reports** list box and the **Port / Device** list box are also highlighted.
2. Click the **Unlink** button.

The report-port pair is unlinked and no longer appears in the **Reports sent / Destination** list box.

Configuring Transmission Parameters

This section describes how to define and configure transmission parameters for reports. The focus of this section is on the reports sent through communication ports. For information on the transmission parameters of reports sent to devices other than the standard ports, see separate Technical References for the corresponding devices. For sending reports to virtual COM ports, please refer to the Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 3.

To configure the transmission parameters of a report sent through a communication port, proceed as follows:

1. Select the desired report-port pair from the **Reports sent / Destination** list box.
2. A corresponding **Configure** frame appears on the left of the view. This frame includes two smaller frames allowing you to configure the **Polled report sending** parameters.

   If you are working on a setup created with MAWS Lizard version 6.0 or earlier, you can also configure the **Report framing** option. If your setup was created with MAWS Lizard 6.0 or later, you have no **Report framing** available; instead, you can perform the equivalent operations in the **Report** view; see the following section.

You can choose both report sending modes (polled or timer enabled) by entering the polled report sending parameters and selecting the **Timed sending enabled** check box.

Adding a Frame to a Report

A report body can be enclosed within a frame consisting of a header and a trailer. A header is a string of characters before the report body, whereas a trailer is a string of characters after the report body. Headers and trailers can be defined to reports to help distinguish them from other reports.

Depending on the version of MAWS Lizard with which a setup, and, therefore, a report was created, the technique of adding a frame to the report differs.

Working with a Setup Created under a Pre-6.0 MAWS Lizard

In the **Report framing** options frame you can define headers, trailers and checksums. These are all optional. A header is a string of characters before the report body, whereas a trailer is a string of characters after the report body. Headers and trailers can be defined to reports to help distinguish them from other reports.

A checksum is used to validate the data of the report. If the received checksum does not match the one calculated when the report was sent,

the report data is corrupt. The desired checksum algorithm for a report can be selected from the checksum combo box

Working with a Setup Created under MAWS Lizard 6.0 or Later

Unlike with earlier reports, the Report Framing options in the **Communications** view cannot be used to add framing information to reports created in MAWS Lizard 6.0 and later. Instead, you need to work in the **Reports** view, and the procedure is as follows:

Unlike with earlier reports, the Report Framing options in the Communications view cannot be used to add framing information to reports created in MAWS Lizard 6.0 and later. Instead, you need to work in the **Reports** view, and the procedure is as follows:

1. In the **Reports** view, make sure you know what report you want to add a header and a trailer; in other words, the report is on the **Existing reports** list.
2. In the **Available templates** list, first select **StringForm**, then click **New**. A new report of type StringForm appears in the **Configure report** frame on the right.

   The new report serves one purpose only: it will be the container for the actual report you want to send and to which you want to add a header and a trailer.
3. Select the **first** cell of the new report. This cell will be the header of the report to be created.
4. With the header cell selected, in the **Text** text field in the **Cell properties** frame, enter the desired information for the header.
5. Select the **third** cell of the new report. This cell will be the trailer of the report to be created.
6. With the trailer cell selected, in the **Text** field in the **Cell properties** frame, enter the desired information for the trailer.
7. Select the **second** cell of the new report. This cell will be linked to the actual report you want to send.
8. In the **Select variables** list, select the report you want to link to the new report you created in the precious steps, then drag it to the second cell in the new report. Your actual report is now linked to the container report.

Configuring Polled Report Sending

The reports created with Lizard can be sent either automatically when created using timers, they can be polled, or both. When the reports are polled, the setup must first receive a poll message through the communication port before the report is sent.

Note that you can choose both report sending modes (polled or timer enabled) by entering the polled report sending parameters and selecting the **Timed sending enabled** check box.

In the **Polled report sending** frame you can define the poll source and the pollstring. The poll source is the communications port or device where the pollstring or the poll message is received from. The pollstring is the poll message, which must be received before the polled report is sent.

If you include %I in the pollstring, a station identifier is added to the poll command. If multiple stations run the same setup and thus have the same poll command(s), only the station with a matching identifier will respond to the poll. The station identifier is set to the QML logger static parameters with the name **sid**. Changing the station identifier requires a reset after the new value has been set.

An example of how to configure transmission parameters for a report sent through a communications port is shown in Figure 37 on page 90. An example of what the transmission parameters of a report sent to a device might look like is shown in Figure 38 on page 95.

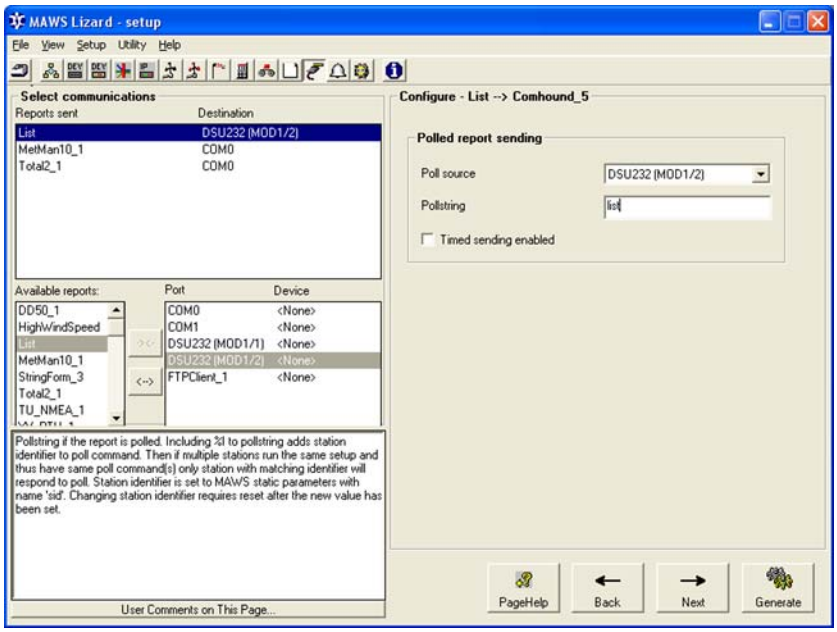

Figure 38 Communications View with Configuration for a Device

NOTE	The information pane with general help information is available on all the configurable items in case you need more detailed information.

Alarms View

In the **Alarms** view you can create alarms to notify you of different occurrences. Alarms can be issued, for example, when the derived quantities exceed the predetermined alarm limits, see Figure 39 on page 96.

Some measurements, such as leaf wetness, also use an alarm to convert analogue measurement to on / off type information with a user-adjustable threshold. These alarms are added to a setup automatically when you select the sensor in the **Equipment** view.

With Lizard Setup Software you can create alarms for different purposes, for example, to trigger reports or to set digital outputs.

NOTE	The number of the available alarm types depends on the selected version, see section Setup Management on page 27.

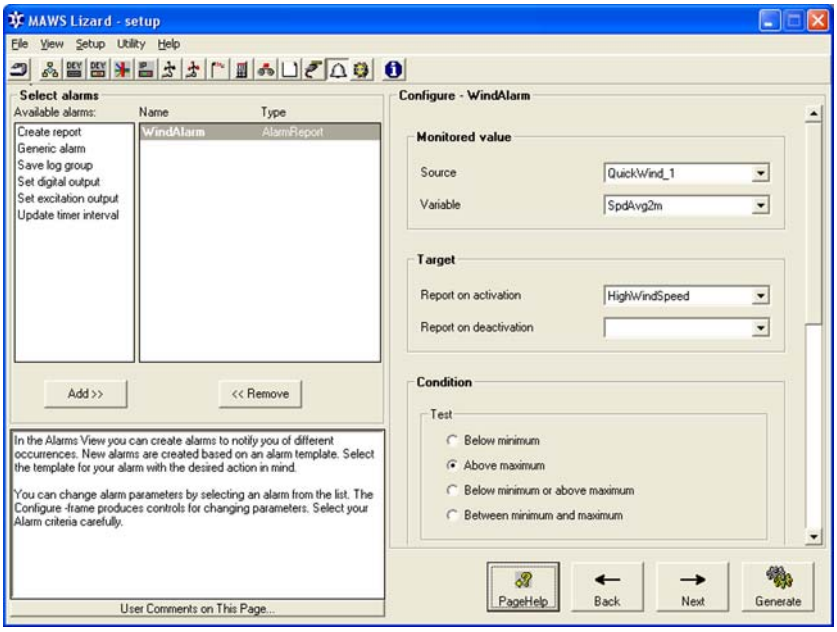

Figure 39 Alarms View

Alarm Types

You can create several types of alarms. These include print report alarms, save log group alarms, set excitation output alarms, set digital output alarms, and generic alarms. All alarms are created in the same way. They are also configured approximately in the same manner. The only difference between the alarms is the way they function. Most of the available alarm types are presented in the following sections.

Print Report Alarms

When you create a print report alarm, the setup sends out a report when predetermined conditions are met. You can, for example, set an alarm for the battery condition in such a way that you are notified with a report when the energy level of the battery goes below the predetermined level.

Save Log Group Alarms

When you create a save log group alarm, instead of sending out a report, the setup saves the desired log group when the predetermined conditions are met. With this type of alarm you can, for example, log data only when certain conditions exist, for example, when it is raining.

Set Excitation Output Alarms

With this alarm type you can control the QML logger excitation outputs of channels 0 to 7, and A and B.

Note that before you can use this alarm, you need to add an excitation output control to your setup. Proceed as follows:

1. Add the excitation control. In the **Equipment** view, select the control from the **Available** list.
2. Connect it to the desired free excitation channel. Note that only channels 0 to 3, and A and B produce suitable output signal for controlling devices such as relays.
3. You can now connect the excitation alarm to the output control. When the configured alarm condition is met, the excitation pin will be set to a high state and remain high until the condition clears.

Set Digital Output Alarms

The set digital output alarm is similar to the excitation output alarm, except that it uses one channel from the optional digital I/O module to serve as the controlled output. You can add the QMI digital I/O module to your setup in the **Optional Hardware** view.

Generic Alarms

With this alarm type you can trigger most of the QML logger user functions. Note that as it provides more complex setup control and very few security checks, use it with caution, preferably only when instructed by Vaisala personnel.

Update Timer Interval

The update timer interval is not an alarm, but it provides threshold-controlled event interval management. You can use it, for example, to change the report triggering interval in steps according to the measured value. This is performed on the Advanced user level. For more information, see section Changing Timer Intervals on page 147.

Creating Alarms

Create the alarms in the **Select Alarms** frame, which is divided into two list boxes. The **Available alarms** list box lists the available alarm types. The **Name / Type** list box contains two lists displaying both the names and types of the created alarms.

To create an alarm, proceed as follows:

1. Choose the alarm type from the **Available alarms** list box by clicking on it.

NOTE	Choose the correct alarm type carefully, because you cannot change the type after you have created the alarm. You can only delete the alarm and create a new one.

2. Drag the selected item into the **Name / Type** list box, or click **Add**.
3. The alarm will be listed in the **Name / Type** list box. The name of the alarm is automatically highlighted suggesting that it can be changed to a more descriptive one. If necessary, change the name at this point, since it may be more difficult or even impossible to do so at a later stage.
4. A blank **Configure** frame to be filled out appears on the left of the view.

Removing Alarms

To remove an alarm, proceed as follows:

1. Click on the row that lists the alarm to be removed in the **Name / Type** list box.
2. Click the **Remove** button.

The alarm is permanently removed from the setup.

Configuring Alarms

Alarms are configured in the **Configure** frame. When you click on the desired alarm in the **Name / Type** list box, the **Configure** frame appears.

To configure the settings of an alarm, proceed as follows:

1. In the **Monitored Value** frame, choose the variable to be monitored by the alarm by selecting the source and the variable from the corresponding combo boxes.
2. In the **Target** frame, choose the report to be sent with the alarm. Select the desired report from the **Report on activation** combo box. If necessary, you can also choose another report to notify you when the alarm condition has seized to exist. Select this optional report from the **Report on deactivation** combo box. If you are configuring a save log group alarm, simply choose the log group to be saved instead of the report to be sent. The procedure is the same.
3. In the **Condition** frame, choose the limits to be verified. First select the value to be monitored from the **Test** options, and then enter the reference value into the corresponding text box below.

NOTE Make sure that you enter the reference value in the correct text box. Only the values corresponding to the **Test** options are taken into account.

NOTE You can choose only one limit type for each alarm. If you want to verify the value against multiple limits, you have to create several separate alarms.

4. In the **Options** frame, the following options are available: By selecting the **Timed report enabled** check box, you can set the alarm to be sent on a timer. This means that the report is sent not only when the alarm condition exists but also at specified intervals. You are usually not recommended to select this option. By selecting the **Generate report on each test** check box, you can set the alarm to be sent the entire time the alarm condition exists, instead of the normal situation when the alarm report is sent only

once when the alarm condition first exists. Select the **Wind direction change alarm** check box when monitoring wind direction values. It enables the correct handling of wind direction limits.

NOTE	The information pane with general help information is available on all the configurable items in case you need more detailed information.

Timers View

In the **Timers** view you can set timers to initiate measurements, calculations, report generation, and logging; see Figure 40 on page 100.

Each event that the QML logger performs has to be synchronized to a certain moment. Lizard automatically sets synchronizing time default values that can be modified.

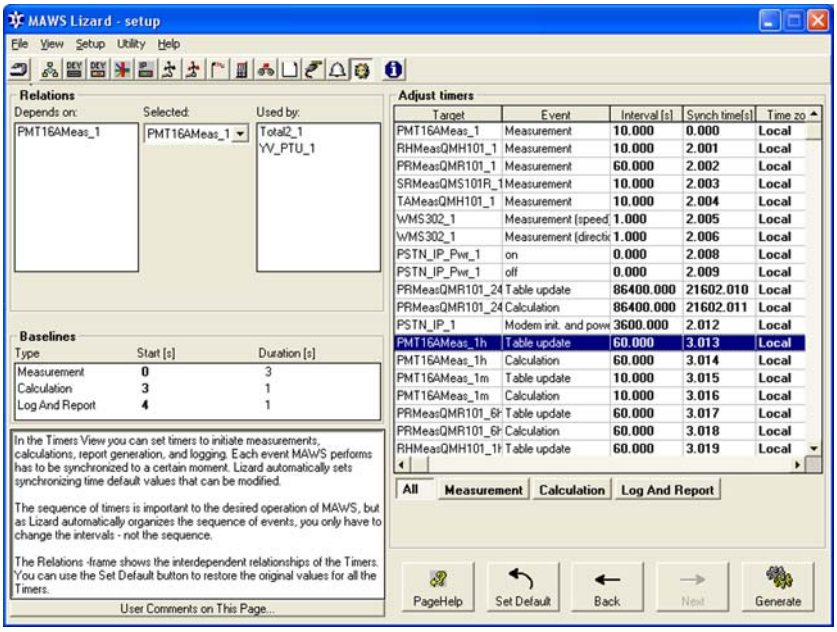

Figure 40 Timers View

NOTE	The sequence of timers is important for the desired operation of the QML logger, but as Lizard automatically organizes the sequence of events, you only need to change the intervals - not the sequence.

Interdependence of Events

The **Timers** view is divided into two parts. The **Adjust timers** frame on the right of the view displays the timed events, whereas the **Relations** frame on the left of the view presents their interdependent relationships.

The **Relations** frame is divided into three parts.

The **Depends on** list box includes the measurements that the measurement or calculation in the **Selected** combo box depends on, in other words, timed events that must happen before the selected timer.

The **Selected** combo box in the middle lists the same measurement and calculations names as the **Target** column in the **Adjust timers** frame.

The **Used by** list box lists all the measurements which again are dependent on the measurement or calculation in question, in other words, timed events that need the selected measurement or calculation to be carried out.

In short, the interdependence of an event can be determined by selecting an event either from the **Adjust timers** frame or from the **Selected** combo box, and by viewing the measurements, calculations, log groups, or reports shown in the **Used by** and **Depends on** list boxes. Once you are aware of the interdependence of certain elements you will know, for example, which measurements you have to remove in order to remove the selected measurement.

Adjusting Timers

The **Adjust timers** frame offers several viewing possibilities. By selecting one of the buttons below the frame you can view all the events simultaneously, or choose to view only the measurements, calculations, or logs and reports.

The table in the **Adjust timers** frame consists of five columns. These are the **Target**, **Event**, **Interval (s)**, **Synch time**, and **Time zone** columns.

The **Target** column displays the names of measurements or calculations that you may or may not have defined, in other words, explains what is being measured or calculated.

The **Event** column lists the event types, whether the event is a measurement, calculation, log group, or report.

The **Interval (s)** column displays the interval of the events in seconds. Some of the intervals are defined automatically by Lizard, and cannot be altered. The smallest recommended interval for the QML logger is ten seconds, with the exception of wind calculations. The most common default interval is one minute (60 s).

NOTE Choose the interval in such a way that 24 hours is evenly divisible by it.

The **Synch time** column lists the synchronization times. The synchronizing time ties the operation to the clock. For example, if an operation is always to be performed twenty minutes to the hour, the synch time should be set to 00:40:00. The smallest synchronizing time increment on the Normal user level is one minute.

In the **Time zone** column you can change the time zone. You can choose between local time and the international time standard Universal Time Coordinated (UTC). When you use UTC time, you have to set the time zone to the QML logger.

You cannot alter the items in the first two columns of the table. You can change the rest of the settings by double-clicking on the default values. After double-clicking you either insert the new value, choose it from a combo box, or use the two arrows to select the correct value. You cannot physically rearrange the order of the events, but changing the intervals and synchronization times leads to the same result.

NOTE The information pane with general help information is available on all the configurable items in case you need more detailed information.

Advanced Use of Timers

CAUTION	You are recommended not to change the user level to Advanced unless you possess profound knowledge of the internal operation of the QML logger. Changing the user level will result in extra columns showing, for example, all the timers. Only alter the synchronization times on the Advanced user level after careful consideration. Careless or faulty changes may cause the entire application to fail.

For instructions on the advanced use of timers, please refer to Timer Configuration on page 141.

Setup Information View

The **Setup information** view provides overall information about the current setup for viewing and printing; see Figure 41 on page 103. You can access the **Setup information** view by clicking the toolbar button or selecting **Setup information** in the **View** menu.

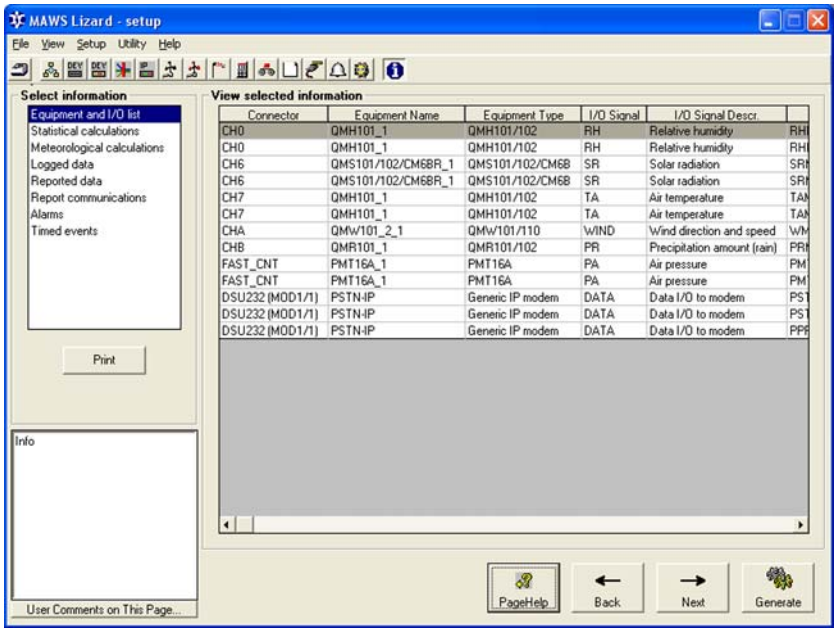

Figure 41 Setup Information View

The contents of the setup information sheets are listed in the following tables.

Table 11 Equipment and I/O List

Col #	Column Label	Content
1	Connector	Logger connector
2	Equipment name	Setup name for the attached equipment
3	Equipment type	Type of the attached equipment
4	I/O signal	I/O signal identifier
5	I/O signal descr.	I/O signal description
6	I/O handler	Handler for the I/O signal, for example, measurement name

Table 12 Statistical Calculations

Col #	Column Label	Content
1	Name	Calculation name
2	Source	Source for the calculated variable
3	Variable	Name of the source variable
4	Functions	Calculated functions: - Min = minimum - Max = maximum - Avg = average - Dev = standard deviation
5	Period [s]	Total calculation period in seconds
6	Interval [s]	Calculation interval in seconds
7	Validation %	The amount of valid samples against total samples before calculation results are marked valid. For example, a value 67 % indicates that one hour calculation executed once per minute must have 40 minutes of valid data before the results are available.

Table 13 Meteorological Calculations

Col #	Column Label	Content
1	Name	Calculation name
2	Calculation	Calculation type
3	Input	Input variable name
4	Source	Source for the input variable
5	Variable	Name of the source variable

Table 14 Logged Data

Col #	Column Label	Content
1	Group	Log group [1]
2	Interval [s]	Logging interval in seconds [1]
3	kBytes / day	Log memory consumption per day [1 2]
4	Source	Source for the logged variable
5	Variable	Name of the logged variable

1. The column contains redundant data which is hidden, that is, data is shown only once in each log group.
2. When the log group contains non-numeric data, such as text or binary arrays, it is not possible to estimate memory consumption. In such cases the column will show 0 (null).

Table 15 Reported Data

Col #	Column Label	Content
1	Report	Report name
2	Interval [s]	Report creation interval in seconds. Note that this is not necessarily the same as the transmission interval, as the report may be polled.
3	Source	Source for the reported variable
4	Variable	Name of the reported variable

Table 16 Report Communications

Col #	Column Label	Content
1	Port	Destination port [1]
2	Comms. Type	Communications type, for example, **Serial line report send** or the communications device type, for example, **PSTN-Modem** [1]
3	Report	Name of the sent report
4	Poll Command	Poll command if the report is polled. If a communications device is attached to the port, this information is not available.
5	Header	Report header string
6	Footer	Report footer string

1. The column contains redundant data which is hidden, that is, data is shown only once in each log group.

Table 17 Alarms

Col #	Column Label	Content
1	Name	Alarm name
2	Interval [s]	Condition test interval in seconds
3	Source	Source for the tested variable
4	Variable	Name of the tested variable
5	Target Act.	Target report or the log group when an alarm becomes or already is active.
6	Target Deact.	Target report or the log group when an alarm becomes or already is inactive
7	Test	Alarm condition in comparison to min or max values: - Below min = Below minimum - Above max = Above maximum - Outside min - max = Below min. or above max. - Between min - max = Between min. and max.
8	Min	Value for the minimum limit
9	Max	Value for the maximum limit
10	Limit Source	Source for the limit when an other variable is used as the limit.
11	Limit Variable	Name of the limiting variable when an other variable is used as the limit.

Table 18 Timed Events

Col #	Column Label	Content
1	Timer #	Timer number. Use this as the first parameter <tevId> in **ctev** command when changing timer intervals through the service or remote command interface: **ctev** <*tevId*> <*interval*>
2	Target	Target component name
3	Event	Triggered event type
4	Interval [s]	Triggering interval in seconds
5	Synch [s]	Synchronization time in seconds counted from 00:00:00 hours
6	Timezone	Time zone: Local or UTC (formerly Greenwich mean time)
7	Timer type	Timer type: Periodic or Single shot

To display and/or to print the setup information, proceed as follows:

1. Click on an item in the **Select information** list. The selected information appears in the **View selected information** frame.
2. Click the **Print** button to send the displayed information to a printer. Usually, a print properties window appears. It allows you to select the destination printer and other printing options. Once the information is correct, click **OK** to proceed with the printing.

Generating and Uploading a Setup

This section describes how to generate a setup and upload it to the QML logger. The setup is usually generated and uploaded once it has been created. Generation is accomplished either from the **Setup** menu or with the **Generate** button. You can also upload the setup to the logger using the AWS Client program.

Generating a Setup for QML Logger

When you have finished creating or modifying a setup, it must be generated in order to be uploaded to the QML logger. Generating a setup means converting the file on your PC into a format that the logger can understand. Only after the setup is generated can it be uploaded into the QML logger, in other words, transferred into the logger and taken into use.

Generating a Setup with or without Script Comments

To generate a setup, proceed using either of the following two ways:

1. Select **Generate** from the **Setup** menu.

   or

2. Click the **Generate** button on the lower right of each view.

By default, script comments are not included in the script file. To create a setup with comments, select **Generate setup with script comments** from the **Setup** menu.

NOTE Unless otherwise advised by Vaisala, generate the setups without the script comments, that is, select **Generate** from the **Setup** menu or use the **Generate** button on the lower right of each view.

Generating Memory Sparing Setup Scripts

On the Advanced user level, an Advanced tab is visible in the **Options** window, see Figure 42 on page 108. By default, the **Wrap long strings in script file** option is set off, because the reconstruction of wrapped strings consumes memory in the QML logger.

NOTE Unless otherwise advised by Vaisala, leave the **Wrap long strings in script file** option unselected.

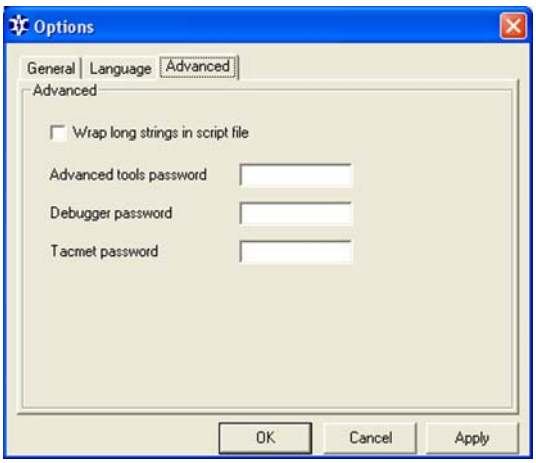

Figure 42 Options Window: Advanced Tab

Tracing Errors in Lizard

When you contact Vaisala HelpDesk in case of a problem situation, please provide a description of the problem and as much additional information as possible. To obtain this information, Lizard Setup Software provides an option for tracing the session you were working on when the problem occurred.

If you receive an internal error message when using Lizard Setup Software, you can trace the error by selecting the option **Start tracing this session** under **Common settings**; see Figure 43 on page 109.

After selecting the **Start tracing this session** option, you should try to recreate the error condition by doing what you were doing when the error message first appeared. After this, close Lizard and access the Lizard installation directory to retrieve the *Lizard1b_ERROR.LOG* file. Proceed to send this file to Vaisala HelpDesk along with a description of the problem.

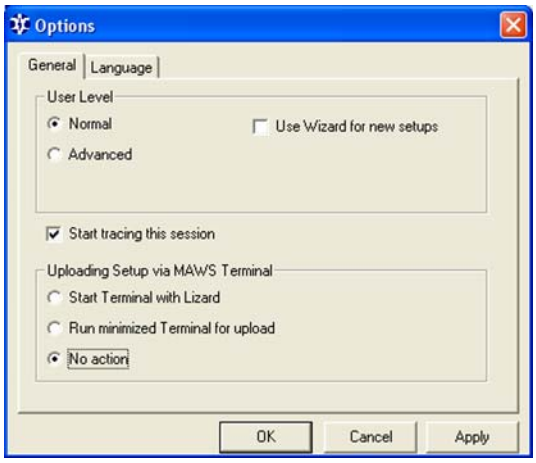

Figure 43 Start Tracing This Session Option

CHAPTER 4

ADVANCED USE OF LIZARD SETUP SOFTWARE

This chapter provides information on the advanced use of Lizard Setup Software.

In order to use the functions described in this chapter, change the user level to Advanced.

Changing the User Level to Advanced

CAUTION	You are recommended not to operate the system on the Advanced user level unless you have profound knowledge of the internal operation of the QML logger. Changing the user level will result in extra columns showing, for example, all the timers. Also, only alter the synchronization times on the Advanced user level mode after careful consideration. Careless or faulty changes may cause the entire application to fail.

Lizard Setup Software includes the following user levels:

- Normal user level is the default option. It allows you to create a setup in a very fast and simple way, using default options for most parameters. This option is recommended for all users. For information on the basic use of Lizard Setup Software, see Basic Use of Lizard Setup Software on page 21.

- Advanced user level is for experienced users only. On this level you will have access to more parameters, thus allowing you to create a setup with more advanced features. One needs to have a thorough understanding of the system functionality in order to be able to fully utilize the advanced features.

To change the user level, proceed as follows:

1. Choose **Options** from the **View** menu.
2. Under the **General** tab, select the desired user level and click **OK**.

External Script

Lizard Setup Software allows additions to the actual code of the setup file, also referred to as the script. These additions can be, for example, functions that Lizard Setup Software does not directly support. You can make these additions with the external script function.

NOTE	Additions to the external script should be made in cooperation with Vaisala personnel.

On the Advanced user level, an **External Script** frame is visible in the **Setup** view, as presented in Figure 44 on page 113. Using the syntax of the ADCL script language, you can add a code section which will be inserted to the end of the generated downloadable setup file under the heading **External Script**. The modified external script will be stored into the current setup.

NOTE	Write any external script with careful consideration, as Lizard Setup Software does not check the syntax. If the syntax is incorrect, you will receive an error message when you try to run the external script.

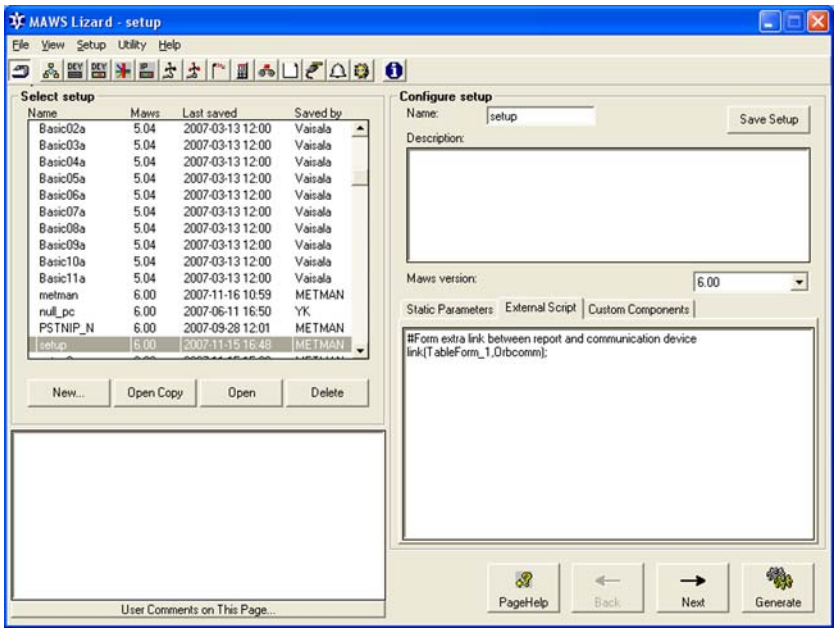

Figure 44 Modifying External Script

Static Parameters

Creating Static Parameters

Lizard Setup Software provides an interface for creating setup-specific static parameters to be used, for example, as station-dependent parameters or as calculation factors. This interface in the **Setup** view is only available on the Advanced user level.

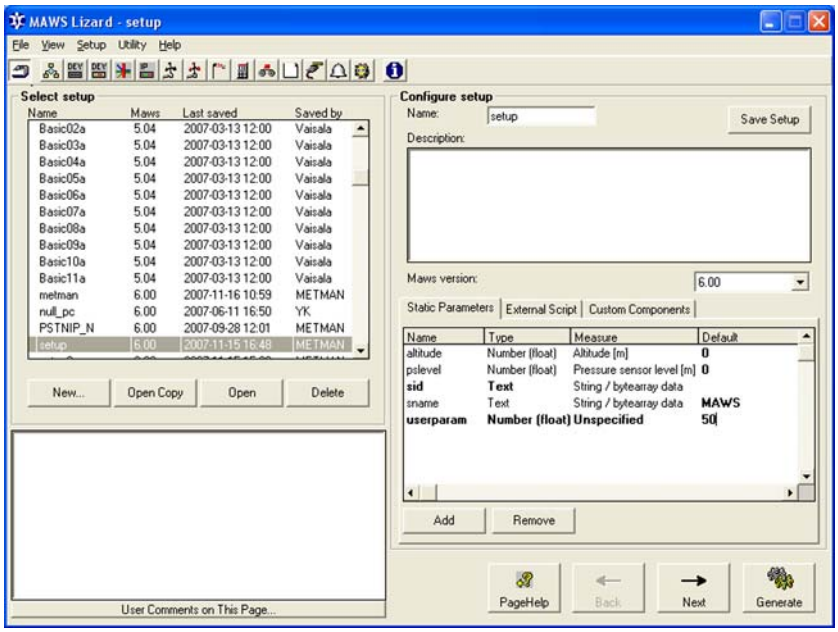

Figure 45 Setup View: Static Parameters Tab

The list in the **Static Parameters** tab shows all the static parameters, including the preset ones. Refer to Figure 45 on page 114. User-editable entries are listed in **bold font**. The **Default** column shows the default values for each parameter.

NOTE	The default value is written to the logger memory only when the static parameter does not have an existing value. For example, if the **sname** parameter already has the value MAWS1 and a new setup is generated with **sname** = *MAWS2*, the existing **sname** value (*MAWS1*) is preserved.

To create a new static parameter, proceed as follows:

1. In the **Static Parameters** tab, click **Add**.
2. Give a name for the parameter. The name may consist of characters A...Z, a...z, 0...9, and _. No spaces are allowed.
3. Select a type for the parameter. The possible options, **Number (float)**, **Number (int)**, or **Text**, appear by double-clicking the bold text in the **Type** column. Selecting the type will determine how the parameter is used. A text parameter, for example, cannot be used as calculation input.

4. If the parameter is numeric, you are recommended to also select a measure unit for it. If the parameter will be used as a station specific calculation parameter, you should provide it with the correct unit, otherwise the calculation configuration may not allow you to use the parameter as input. If there is no suitable unit available, select **unspecified**. This causes the parameter to be applicable for all use.
5. Enter a default value for the parameter.

NOTE	All parameters are automatically created to the QML logger when the setup is uploaded.

Changing Values of Static Parameters

The value of a static parameter, which can be a default value given in Lizard Setup Software, can be changed in the AWS Client Static Parameters window. The window shows a hierarchical list of all parameters and their values, also those that have been set directly with AWS Client software; see Figure 46 on page 116. To change the value of a static parameter, proceed as follows:

1. Start AWS Client and connect to the QML logger.
2. On the **Settings** settings menu, select **Parameters - Static**.
3. Expand the list for the parameter set whose parameters you want to change by clicking the plus sign next to the parameter set name.

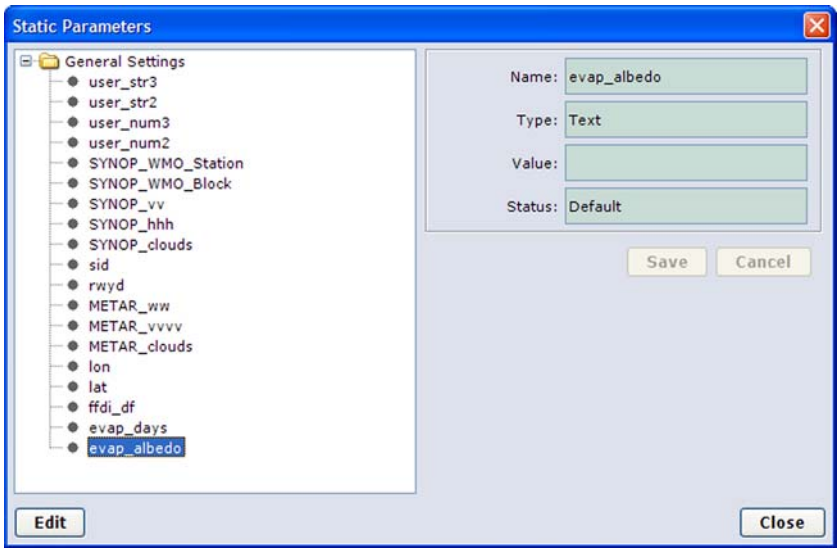

Figure 46 Static Parameters Window

4. Select the parameter whose value you want to change. For the selected parameter, AWS Client displays the name, type, value, and status of the parameter.
5. To change a parameter value, select **Edit**.
6. Enter the new parameter value in the **Value** field.
7. Click **Save** to store the new parameter value. You can change the values of further parameters in the same manner.

Parameter Sets

To manage an increasing number of station specific settings, another type of static parameters, parameter sets, have been introduced. As implied by their name, parameters belonging to certain functionality can be grouped together to be handled as a single entity.

NOTE	Parameter sets are available only for setups created for QML logger software versions 6.00 or later.

As with other static parameters, default values for parameters in sets are provided by the setup file. Station specific settings are made during commissioning using AWS Client software and/or directly by issuing QML logger shell commands.

In addition to being provided by the user, certain network parameters, such as IP addresses and subnetwork masks, may be configured so that they are automatically provided by the network.

Parameter Set Management In Lizard

The parameter set for a certain component or functionality is usually managed in the corresponding configuration view. In addition to this, Lizard provides a common configuration view for all parameter sets. To access this view, shown in Figure 47 on page 117, select **Parameter Sets** from the **Setup** menu.

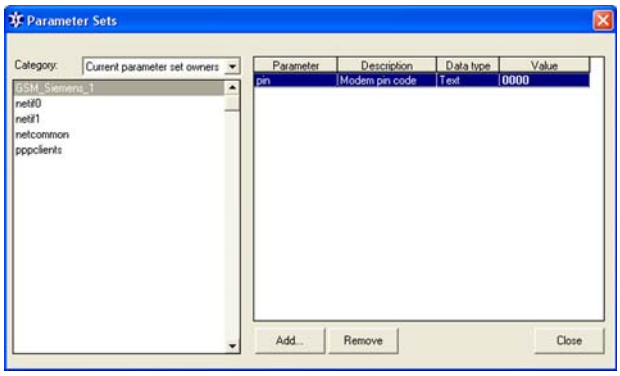

Figure 47 Parameter Sets Window

NOTE	Do not remove or rename any of the preconfigured parameters unless specifically instructed to do so. The affected components will most likely stop from functioning if the required parameters are not present.

To access the parameters for a certain set, select the set from the list on left side of the view. The content of the list can be filtered by selecting a different category from the pull-down menu above the list.

To add a parameter to a set, proceed as follows:

1. Click **Add**
2. Give the parameter a name and click **OK**.
3. Enter a description for the parameter by double clicking its **Description** field.
4. Select a data type for the parameter. The available options are **Text**, **Boolean**, **Number (float)**, and **Number (int)** for character

strings, true/false parameters, floating-point numbers, and integers, respectively.

5. Enter a default value for the parameter, either by double clicking the value field and entering a value, or by selecting a value from the list (parameters of type **Boolean**).

To remove a parameter from group, proceed as follows:

1. Select the parameter to be deleted from the list.
2. Click **Remove**.
3. Confirm removing the parameter by clicking **Yes**. You can also cancel removing the parameter by clicking **No**.

NOTE

Default values provided by the setup never overwrite any existing station specific settings in the QML logger. If the existing parameters in QML have not been modified from the previous setup default values, new defaults from the setup will overwrite them.

When you need to start with a clean configuration, remember that in addition to loading a new setup, you need to erase the static parameters and parameter sets associated with the earlier setup.

In addition to being configured in Lizard Setup Software, parameter sets and the parameters contained in them can also be changed at runtime using QML logger shell commands. The commands for managing parameter sets are described in section Commands for Parameter Sets in Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 3.

Time Receiver

With the **Time receiver** function you can set and read the system time without opening a service connection. Add and connect the **Time receiver** to a serial port in the **Equipment** view of Lizard Setup Software. You can then set and read the system time through the serial port using the command strings described below.

Setting System Time

To set the system time, give the following command:

<SOH> **TIME** <STX> YYYY MM DD HH MM SS <ETX> <*checksum*>@

The system responds to the **TIME** command with ACK when the command is executed successfully or NAK when the command fails. The response is optional and you can disable it in the **Measurements** view of Lizard.

The checksum is the 2-character 8-bit XOR calculated from the characters between <STX> and <ETX>.

You should also enter the **Time tolerance** in Lizard. When the difference between the system time and the new time setting is smaller than the given **Time tolerance**, the system time is not adjusted but the system responds with ACK.

Reading System Time

To read the system time, give the following command:

TIME <CR>

The response string is as follows:

```
?<STX>YYYY-MM-DD HH:MM:SS<ETX><checksum>@
```

The checksum is calculated as described above.

Log Sender

With the **Log sender** function you can poll the logged data without opening a service connection. Add and connect the **Log sender** to a serial port in the **Equipment** view of Lizard.

To poll the logged data, give the following command:

LOG *Lx YYMMDDhhmmss n*<CR><LF>

where

Lx	=	Log group, for example, L0
YYMMDDhhmmss	=	Date and time of the requested log data

n	=	Number of records to return, starting from the given time

Alternatively, you can also give the following command:

LOG *Lx YYMMDDhhmmss* [1] *YYMMDDhhmmss*[2]<CR><LF>

where

Lx	=	Log group, for example, L0
YYMMDDhhmmss[1]	=	Starting date and time of the requested log data
YYMMDDhhmmss[2]	=	Ending date and time of the requested log data

The QML logger responds to the **LOG** command with a string including the requested log data.

For example, with the following command you can poll five records stored to the log group L0 after 20.08.2007 at 10:30:00:

```
LOG L0 070820103000 5<CR><LF>
```

The **LOG** command is also available in the remote command interface, that is, log groups can be polled through the ORBCOMM, Autotrac, and Inmarsat-C interfaces. However, the data is limited by the capabilities of the used communication system, for example, by the limited character set of Autotrac.

Analog Measurement Wizard

The Advanced user level of Lizard Setup Software offers the option of using an analog measurement wizard. This measurement setup wizard was created to make, for example, the interfacing of OEM measurement instruments easier.

To configure an analog measurement with the measurement setup wizard, proceed as follows:

1. In the **Equipment** view, add the **Generic 16 bit A/D** component and give it a more descriptive name. Connect it to the desired input.

2. Proceed to the **Measurements** view and select the newly added measurement. Rename the measurement component if necessary.
3. Open the **Utility** menu and select the **Wizard** option. The window presented in Figure 48 on page 121 appears.

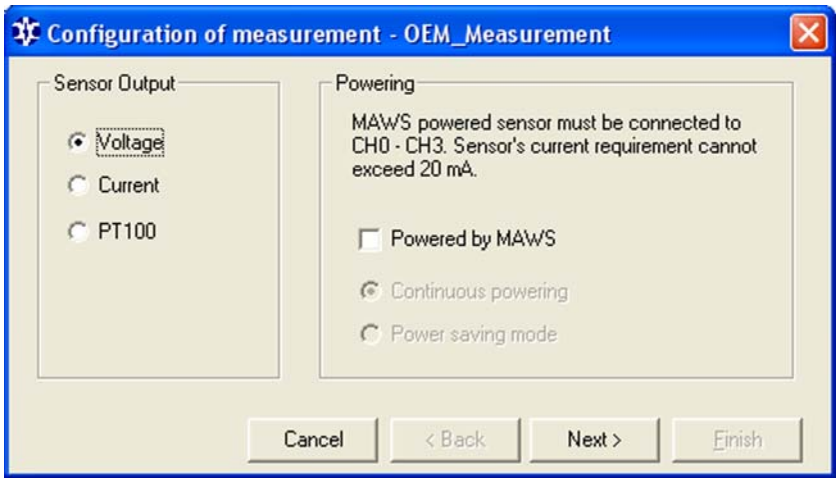

Figure 48 Selecting Input Type and Powering

This window contains selections for:

- Sensor output: voltage, current, or Pt100 resistance
- Powering requirement from measurement channel's excitation output. Note that the channels 0 to 3 can supply 12 VDC / 20 mA, while the channels 4 to 7 have only 1 mA or 100 µA fixed current supply. If the device is powered by MAWS, a further selection between the continuous and power saving (device is powered only when measured) modes can be made.

NOTE	Pt100 measurement cannot be configured with the measurement setup wizard, but a preconfigured Pt100 sensor can be selected from the equipment list.

4. Click **Next** to open the conversion parameter setup window presented in Figure 49 on page 122.

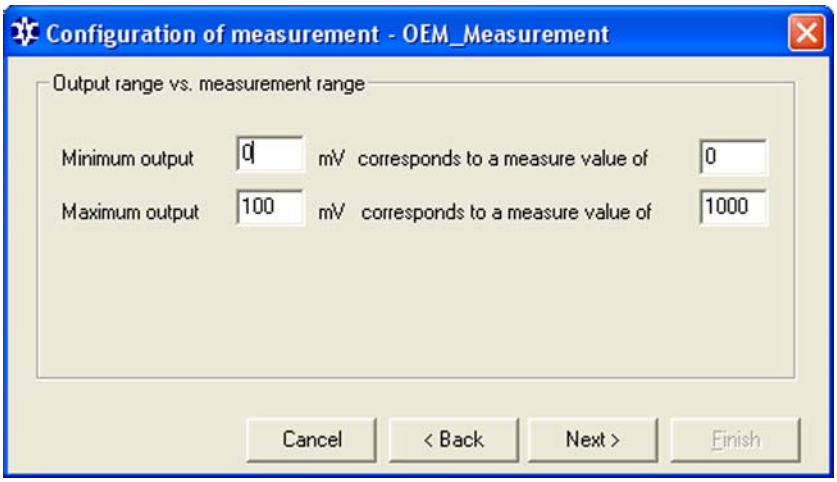

Figure 49 Converting Parameter Setup

5. Set the conversion parameters from electrical to physical units as follows:
   - Enter the sensor's minimum and maximum output values in the **Minimum output** and **Maximum output** boxes. For voltage measurement, the maximum range allowed is from -2500 mV to 2500 mV, and for current measurement from 0 mA to 20 mA
   - Enter the corresponding minimum and maximum physical values in the rightmost boxes.

NOTE	If the sensor's output voltage range exceeds the maximum range allowed, voltage division with external resistors can be used to drop the output to the suitable range.

6. Click **Next** to conclude the setup and view the electrical connection, presented in Figure 50 on page 123. The leftmost box shows the pins on the external connector and the rightmost shows the pins on the QML logger.

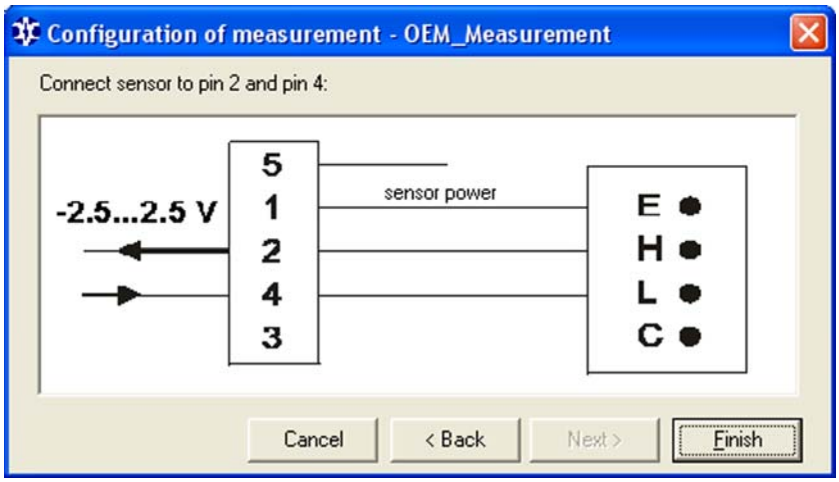

Figure 50 Electrical Connection View

7. Click **Finish** to exit the wizard.

   After configuring with the measurement setup wizard, you can further view or edit the parameters using the standard Lizard setup view for analog measurements.

Combined Wind Speed and Direction Measurement

The QMW Combined Wind Speed and Direction Sensor supports sampling rates of less than 1000 ms. Less than 1 s sampling interval is seldom needed, however, even 4 Hz (250 ms) sampling is possible.

Offset and gain are sensor-specific parameters and normally you should not change the default values when a standard QMW sensor is used. The gain and offset values are variables of the anemometer transfer function:

$U = \text{offset} + F \times \text{gain}$

where

U	=	Wind speed [m/s]
F	=	Sensor output frequency [Hz]
offset	=	-0.24 (default for QMW)
gain	=	0.699 (default for QMW)

Enter the sampling rate, gain, and offset in the **Measurement configuration** frame of the **Measurements** view, see Figure 51 on page 124.

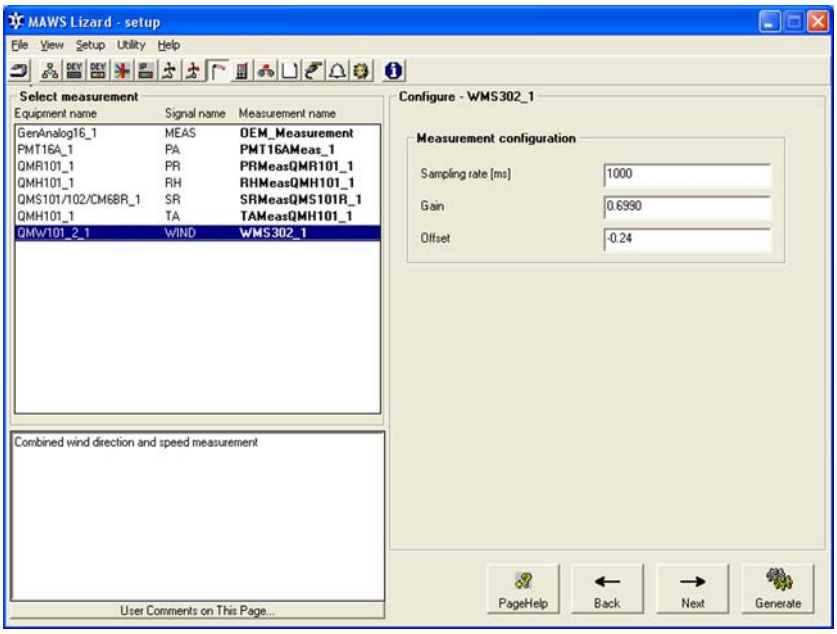

Figure 51 Measurements View: Configuring Combined Wind Speed and Direction Measurement

Generic Statistical Calculations

Generic statistical calculations should be used when the functions provided by the preconfigured average, minimum, maximum, sum, and deviation statistics are not suitable.

The statistical calculations are based on data tables and queries made from them.

A data table is made up of a total period and an update interval. Long duration or short update intervals require a longer table. You must set the update interval equal to or multiple of the update interval of the source value, for example, measurement.

The start time and period of a calculated function can be defined by a statistical query. A query can contain one or more update intervals.

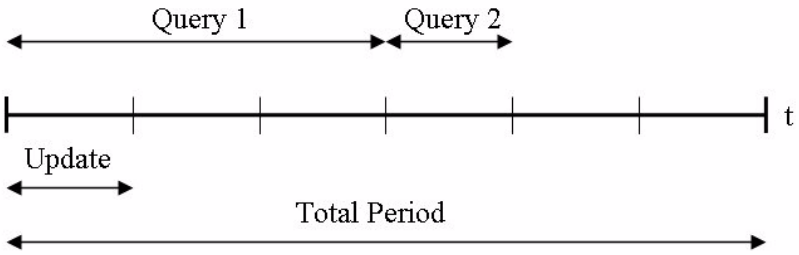

Figure 52 Example of Data Table and Queries

Example table configuration:

- Total period: 3600 second
- Update interval: 600 seconds

The average value for the first half an hour can be obtained with the following query (Query 1 in Figure 52 on page 125):

- Function: Average
- Start: 3600 s
- Period: 1800 s

Average value for the next ten minutes after the half hour can be obtained with the following query (Query 2 Figure 52 on page 125):

- Function: Average
- Start: 1800 s
- Period: 600 s

Note that the start for a query is set backwards from the current time, for example, 0 means current, and the value equal to total duration, starts the query from the oldest update interval. Both query start time and period must be equal to or multiple of the update interval.

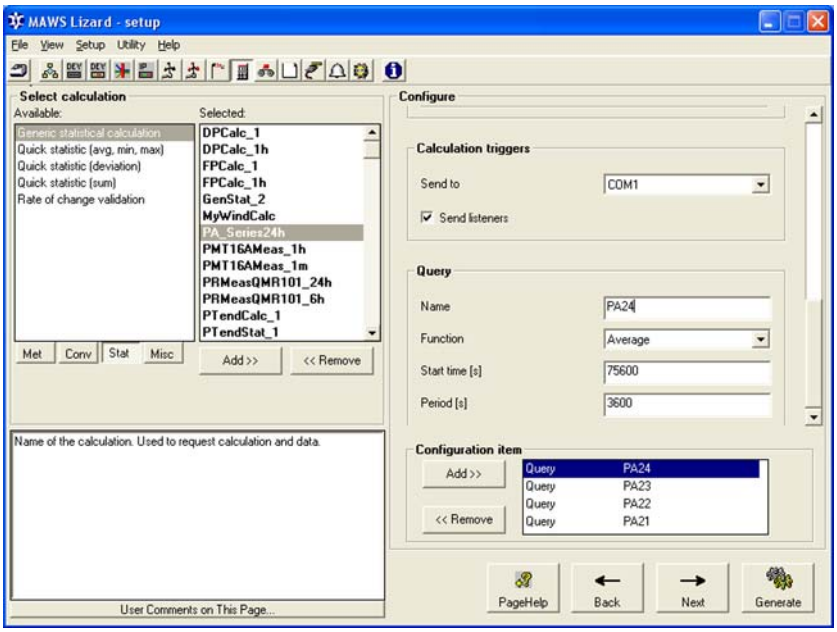

Figure 53 Calculations View: Setting Up Queries

You can set up queries for generic statistical calculations in the **Calculations** view presented in Figure 53 on page 126.

When you open the **Calculations** view and select a generic statistic from the **Selected** list box, a **Configure** frame appears on the right of the view. A **Configuration Item** frame is at the bottom of this frame.

The **Configuration Item** frame contains **Add** and **Remove** buttons and one default query which acts as a template for new queries.

To set up a query, proceed as follows:

1. Select the line containing the desired query.
2. Click the **Add** button to make a copy of it.
3. A **Query** frame appears above the **Configuration Item** frame. In the **Query** frame you must give a unique name to the query, and define the calculated function, start time, and period of the query. The new query will also appear in the list with the default query.

Additional Calculation Options

In addition to available preconfigured statistics options, the generic statistics provide the following configurations; refer to Figure 54 on page 128:

- **Current sample interval(s):** Gives an interval how often the value for the current sampling period is updated, the value which can be requested by setting both query parameters Start time and Period to **0**. By default, it is set equal to the calculation interval, but if, for example, a cumulative precipitation sum for the current hour is requested, it can be set to a shorter value.
- **One sample per interval**: Stores only one sample per interval. If, for example, multiple measurements are made during an update interval, only the last one is stored. You are recommended not to select this option.
- **Show zero sum**: Effective only with sum statistics. Selects whether the statistics show 0 or invalid value after a device reset or when requesting a current sample value right after statistics stepping (see current sample interval). On by default.
- **Calculate complete interval**: Starts the calculation upon the first complete interval.

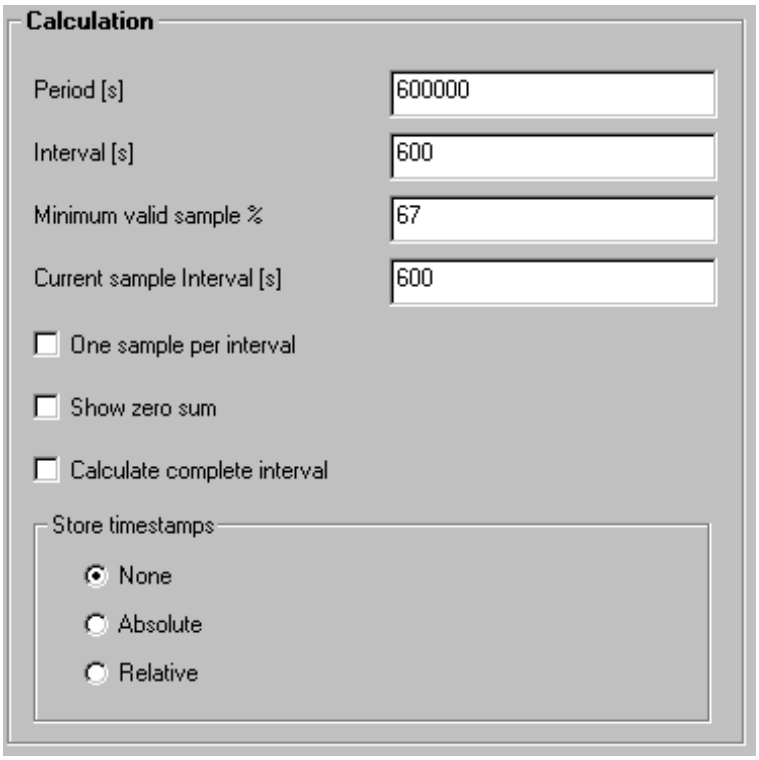

Figure 54 Additional Calculation Options

Setting Unit for Generic Sensors

Lizard Setup Software has internal knowledge about predefined sensors. Hence it knows which sensor produces, for example, wind speed or air temperature. This information is needed later when a unit conversion is required or variable data sources are shown for a specific calculation.

For example, in case of a wind calculation, Lizard shows only the data sources whose output type is wind speed or wind direction.

You can also define the conversion unit for a generic sensor, for example a counter, frequency, or analog sensor. For generic sensors, use the options in the **Measure** frame of the **Measurements** view. Figure 55 on page 129 illustrates how to set the unit of frequency measurement to meters per second.

Later in the setup, the measurement can be used like any predefined sensor.

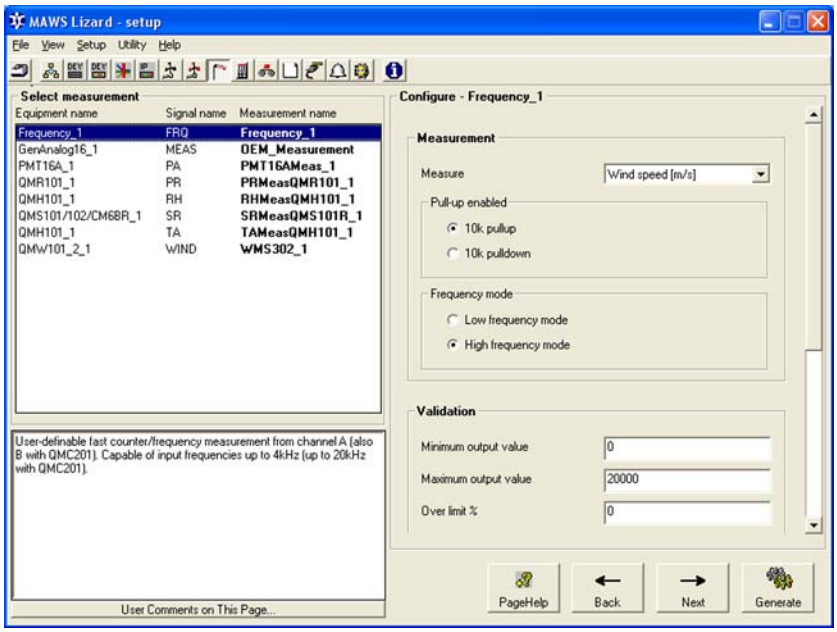

Figure 55 Measurements View: Configuring Frequency Measurement

Setting Unit and Conversion for Manual Sensors

Unit conversion is valid for **float** type of manual sensors only. For **string** type manual sensors, there is no need for conversions. For **integer** type manual sensors, rounding causes unnecessary errors.

In addition to defining the unit, you can also define a conversion from the input value to another unit. For example, you can define the input parameter as air pressure, but instead of entering it in the unit of hecto-Pascals, it can be entered in the unit of inches of mercury.

For example, to define a unit conversion for the manual sensor measuring air pressure, proceed as follows:

1. Enter pressure data in inches of mercury.
2. The manual sensor component converts air pressure to hecto-Pascals, so that all the predefined pressure calculations will also work for this manually entered data.

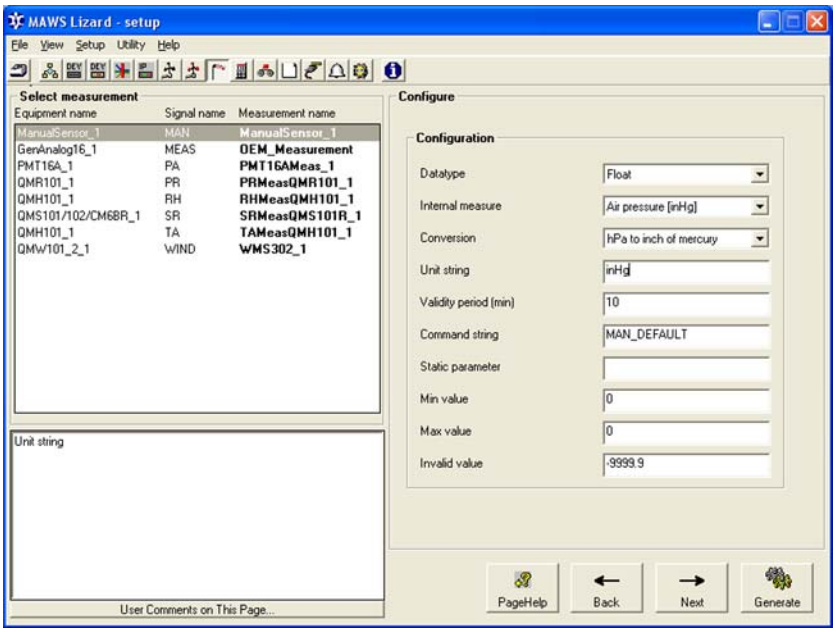

Figure 56 Measurements View: Configuring Manual Sensor

The **Validity period (min)** option defines how long the manually entered data will keep its value before being cleared. The purpose of this is to clear old values automatically and to avoid them being used and reported. If you enter "0" as the **Validity period (min)**, the value is kept endlessly, even after reset.

The **Command string** option defines the command that will be used in the QML logger to enter the value for a manual sensor. The string must begin with *MAN_*.

Static parameter defines the static parameter that stores the entered value. This option can be used to store the entered value over reset.

The **Min value** and **Max value** options are used to validate the manual input. If the data entered exceeds these values, the data items will be marked as *Invalid*.

Invalid value is the value that is set when the manually entered data exceeds its **Min value** or **Max value**. This is also a user-configurable parameter.

NOTE	The **Unit string** field entry will be used later in the AWS Client software to display the unit of the sensor.

Arithmetic Formula

The arithmetic formula enables you to write simples formulas, such as A + 1.2*B - C*D + 3.14. The formula can include four operands and a set of operators or predefined functions. The supported operators are: +,-,*,/,%,|,^,&,<<,>>,||,&&,==,!=,<,<=,>,>=. The operators are described in Table 19 on page 131.

Table 19 Operators in Arithmetic Formulas

Operator	Description
+	Addition
-	Subtraction
*	Multiplication
/	Division
|	Bitwise-inclusive-OR
^	Bitwise-exclusive-OR
%	Calculates the integer remainder r of oper1/oper2 such that oper1 = i * oper2 + r, where i is integer and r has same sign as oper1, and the absolute value of r is less than the absolute value of oper2 .
<<	Left-shift
>>	Right-shift
||	Logical-OR
&&	Logical-AND
==	Equality comparison
!=	Inequality comparison
<	Less than comparison
<=	Less than or equal comparison
>	More than comparison
>=	More than or equal comparison

The supported functions are: sqrt, fabs, log, log10, exp, pow, fmod, sin, cos, tan, round, floor, ceil, trunc. The functions are described in Table 20 on page 132.

Table 20 Functions in Arithmetic Formulas

Function	Description
n sqrt(n)	Calculates the square root.
n fabs(n)	Finds absolute value of parameter.
n log(n)	Calculates the natural logarithm of parameter.
n log10(n)	Calculates the base-10 logarithm of parameter.
n exp(n)	Calculates the exponential value of parameter.
n pow(n1,n2)	Calculates n1 raised to power of n2.
n fmod(n1,n2)	Calculates the floating-point remainder n of n1/n2 such that n1 = i * n2 + n, where i is integer and n has same sign as n1, and the absolute value of n is less than the absolute value of n2.
n sin(n)	Calculates the sine value of parameter.
n cos(n)	Calculates the cosine value of parameter.
n tan(n)	Calculates the tangent value of parameter.
n round(n)	Rounds an argument value to the nearest integer.
n floor(n)	Calculates the floor of a value. Returns a value representing the largest integer that is less than or equal to n.
n ceil(n)	Calculates the ceiling of a value. Returns a value representing the smallest integer that is greater than or equal to n.
n trunc(n)	Converts floating point n to integer by simply removing any fractional part of parameter.

Configuring Arithmetic Formula

To configure an arithmetic formula, proceed as follows:

1. Open an existing setup in the **Setup** view or create a new one.
2. Proceed to the **Calculations** view to configure arithmetic formula.
3. Click **Conv** to list the available options.
4. Select **Arithmetic formula** from the **Available** list and click **Add**.
5. Configure your operands by selecting for each:
   - **Source**: the source component, for example, a measurement
   - **Variable**: the variable to be used from the source
6. Write your formula, for example: *A + B + pow(C,3)*

Using Arithmetic Formula Variables

To check which variables are available, proceed as follows:

1. Go to the **Reports** view.
2. Create a new report or select an existing one to include the variable for the output of the arithmetic formula.
3. Select **AritmeticFormula_1** in the **Available** list in the **Select Variables** frame.
4. Add the variable to your report.

Logging User Interaction

With the standard data logging feature of Lizard Setup Software it is also possible to log user interaction, for example, to store information on setup changes, sensor enable/disable, and so on. The following user interfaces support the logging of the user interaction:

- Service connection, including the AWS Client software
- Remote command interface

To create the log group(s) for the input from the devices listed above, configure the log group(s) as follows:

1. Create a new log group as shown in Figure 57 on page 134. Do not include other types of variables in this log group.

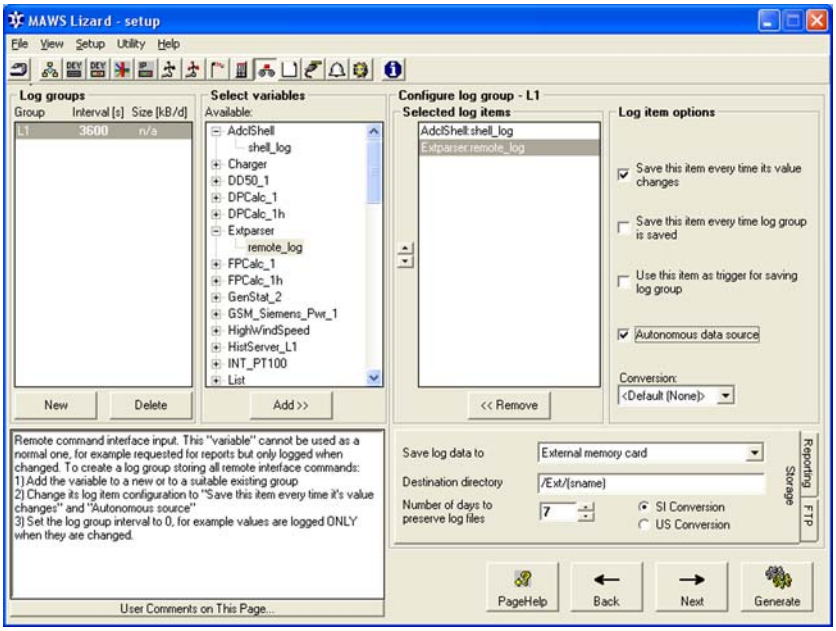

Figure 57 Logging View: Defining User Interaction Log

2. Add one or several of the following variables to the log group:
   - Service connection: **AdclShell.shell_log**
   - Remote interface: **Extparser.remote_log**
   - Local MMI: **OMD201_1.mmi_log**

3. For each log item, select the following options in the **Log item options** frame:
   - **Save this item each time its value changes**
   - **Autonomous data source**

4. In the **Log groups** list, set the **Interval** to zero.

   To see the user interactions, for example, from the service connection, type the following:

   logshow <*group_id*> [*YYMMDDhhmmss*] [*count*]

```
/Log > logshow L0 050510180100 6
AdclShell:shell_log
2005-05-10 18:01:02 V-----
In: Session started
2005-05-10 18:01:02 V-----
```

```
In:
2005-05-10 18:01:03 V-----
In: dir
2005-05-10 18:01:07 V-----
In: cd /Log
2005-05-10 18:01:08 V-----
In: dir
2005-05-10 18:01:11 V-----
In: logshow L0
```

Automatic Report Formatting

On the Advanced user level, you can also format or compress reports. This function is particularly useful when you need to transfer data using methods that are costly or otherwise limit the amount of data sent, for example, satellite transfer systems and SMS messages.

Automatic report formatting is only available for string form reports. You can choose the formatting method before setting up the report, or you can change it later on. Vaisala does not provide software for unformatting formatted reports.

Lizard Setup Software offers two methods for automatic report formatting: BASE32 and BCD report formats.

The BASE32 report formatting method produces ASCII data and thus printable characters. With this method, every measured value is scaled and converted using a radix of 32 instead of 10.

The BCD (Binary Coded Decimal) method is a Positional Number System, with a radix of 10 and coefficients expressed in 4-bit binary words. The BCD formatting method produces non-printable binary reports.

You can access these formatting methods from the **Report Formatting** combo box in the **Report Format** frame of the **Reports** view, see Figure 58 on page 136. Make sure that you have selected the **Report** tab.

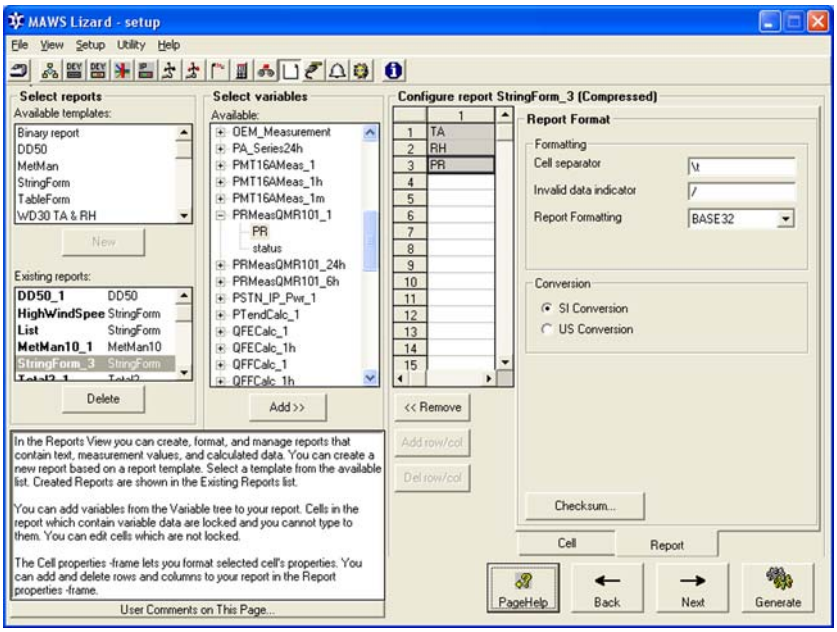

Figure 58 Reports View: Formatting Reports

Before formatting or compressing the report, you must scale the values to reduce the amount of space they require. Perform the scaling in the **Report Format** frame separately for each measured value. When unformatting the reports, perform the same scaling procedure in a reverse order.

Select the **Cell** tab. The **Scaling parameters** frame contains three text boxes with titles **Offset**, **Multiplier** (**Pre-conversion scale** in early Lizard Setup Software versions), and **Field width** as shown in Figure 59 on page 137.

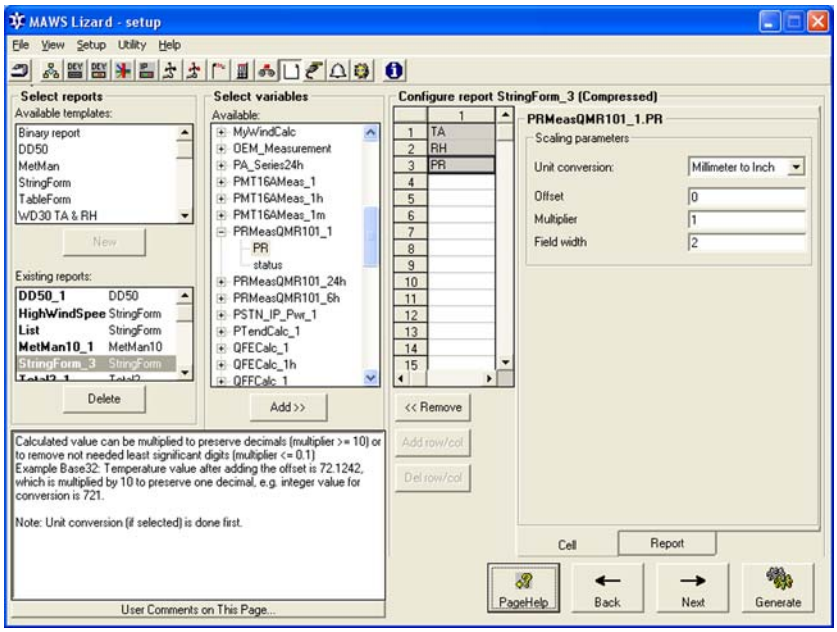

Figure 59 Reports View: Scaling Report Values

The **Offset** parameter value is added to the original value to get rid of a sign or to get rid of unused value area. For example:

- Air temperature range -50 ... +70 -> offset 50
- Barometric pressure range 600 ... 1100 -> offset -600

The **Multiplier** value is multiplied by the scale to preserve the decimals (scale >= 10) or to remove the least significant digits that are not needed (scale <= 0.1).

Example of BASE32 is as follows:

The temperature value after adding the offset is 72.1242, which is multiplied by the scale of 10 to preserve one decimal. The integer value for the conversion is 721.

The value of the **Field width** text box indicates the field width (characters or four bit nibbles) for the compressed value. Zeros will be added in front of the value if the actual length is smaller.

Lizard Setup Software will automatically suggest default values for the offset and scale of the BASE32 and BCD compressions, and for the fixed length value of the BASE32 compression.

Scaling is performed in the following manner:

The **Compression Offset** value is added to the measured value. This will reduce the number of characters in the measured value. The length of the measured value is further reduced by omitting the decimal point by multiplying the value with the **Compression Multiplier** value. Finally, the length of the report can be reduced by omitting spacing between the report items. Perform this by entering the correct value in the **Fixed length** text box.

For example, to convert the 5-character temperature value -18.7 into the 2-character BASE32 value 9P, proceed as follows:

1. Apply the offset: -18.7 + 50 = 31.3 (-50 is minimum measured value)
2. Scale the value: 31.3 × 10 = 313 (desired resolution 0.1 degrees)
3. Convert to BASE32. The result will be the compressed value 9P.

NOTE The compression of the report will fail if the value is still negative after the **Compression Offset** value has been added.

NOTE The **Fixed length** default value applies only to the BASE32 compression. When the BCD compression is used, you must manually adjust this parameter to match the maximum number of characters in the numeric printout of the value. For example, if the maximum measurement value after scaling is 99999, the **Fixed length** parameter has to be set to 5.

Examples of compressed reports are shown below. Reports contain the following data: timestamp, current and daily temperature (average, minimum, and maximum), current and daily humidity (average, minimum, and maximum), dew-point temperature, current air pressure (QFE and QFF pressures), wind direction and speed, wind chill factor, and hourly and daily precipitation sum.

Original (94 bytes):	2005-11-08 11:30:04 -2.4 -0.2 -2.7 1.0 85 92 86 96 -4.6 985.5 985.6 988.8 127 1.0 -2.4 0.0 5.0
BASE32 (44 bytes):	0TUKGKCESFIEPFU2L2S2M30E63OF3OG3PG3V0AES001I
BCD (30 bytes):	10 05 20 82 04 47 64 98 47 35 10 85 92 86 96 45 43 85 53 85 63 88 81 27 01 04 76 00 00 50

NOTE As BCD data is binary and therefore cannot be printed, the actual data bytes are shown.

User Definable Field Formatting

The **Reports** view in Lizard provides the defaults and modifiable cell attributes that are suitable for the reporting needs of most applications. However, to enable the use of all formatting options of the underlying report engine, Lizard provides a **User format** box for Advanced users in the **Cell properties** tab. See Figure 60 on page 139.

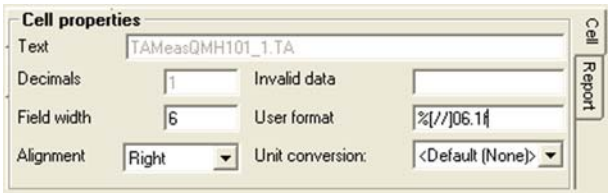

Figure 60 Advanced User Level Cell Properties Tab

The format setting in the **User format** box overrides all other format settings for the selected cell. When you have defined this format, all other inputs for the cell are disabled reflecting the default or previous

settings. There is no connection between the user format and the other settings.

Enter the user format string using a syntax similar to print formatting with the C programming language. The syntax and most commonly used alternatives are listed below. Parameters in curly brackets {} are optional.

%[inv**]**{flags}{width}{**.**precision}**type**

where

%	=	Beginning of the format string
[ ]	=	Text enclosed in square brackets defines the output when a value is invalid
{flags}	=	Justification and prefix. Alternatives: - Left align + Use sign also for positive values 0 Zero prefix the value
{width}	=	Total field width including the sign, decimal point and other additional characters. If the value cannot be fit to the given width, the width will be extended.
{.precision}	=	Number of decimals to print for floating point numbers
type	=	Type specifier: d Signed integer f Floating point value E Floating point value with exponent presentation s Text string b Byte array c Single character

For example, user format **%[//////]06.1f** generates an output with the following characteristics:

- Six slash characters appear in the report when the value is invalid.
- Reporting prefixes the value with zero(es) when the width of the value is less than the total field width of 6 characters.
- Reporting shows one decimal for the value.
- Reporting uses floating point output.

NOTE	Lizard does not check the syntax of the string you enter. An incorrect user format definition may cause unpredictable results when running the setup.

Timer Configuration

This section provides detailed information on the advanced configuration of timers.

Principles of Timed Operation

All actions performed by the configured weather station are synchronized by application timers. To provide the correct interval and sequence of execution, for example to perform measurements before calculations, the parameters of the related timers must be set correctly.

In most cases Lizard Setup Software takes care of sequencing in such a way that you only have to adjust timer intervals manually to meet the requirements of specific applications.

Timer Operation and Parameters

This section describes the timing parameters as handled by the QML logger. The following presentation of parameters only appears on the Advanced user level. On the Normal user level, the presentation of parameters is simplified.

Table 21 Application Timer Parameters

Parameter	Use
Interval	Interval for timed events
Synchronization time	Time after midnight to which the timer is synchronized
Timezone	Select whether the timer is tied to local time (default) or to Coordinated Universal Time (UTC)
Type	Timer type: 0=single shot, 1=periodic
Scale	Timer scale: 0=relative to start of timing services, that is, system startup. 1=absolute time

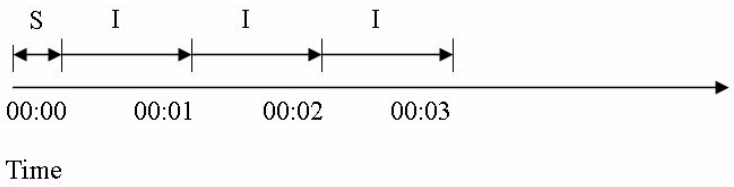

Figure 61 Intervals and Synchronization Times

The following letters refer to Figure 61 on page 142:

S = Synchronization time

I = Interval

Interval and synchronization times are presented in milliseconds. For synchronization time, however, only full seconds correspond to actual time. The milliseconds only give the order of execution for timed events synchronized to the same second.

Example 1

The timed event is executed once a minute, two seconds after a full minute:

- Scale: 1 (absolute)
- Type: 1 (periodic)
- Interval: 60000
- Synchronization time: 2000

Example 2

The timed event is executed once a day at 06:00:

- Scale: 1 (absolute)
- Type: 1 (periodic)
- Interval: 86400000
- Synchronization time: 21600000

Example 3

The timed event is executed once, one minute after system startup:

- Scale: 0 (relative)
- Type: 0 (single shot)
- Interval: 60000
- Synchronization time: 0

Example 4 (Two Timers)

Both timed events are executed once a minute, two seconds after full minute. Timer A starts first:

- Scale: 1 (absolute)
- Type: 1 (periodic)
- Interval: 60000
- Synchronization times: Timer A 2004, Timer B 2005

Example 5 (Timer Sequence)

Sequence:

- The measurement is executed six times a minute, at 0 s, 10 s, 20 s, and so on.
- Statistics store each measurement, which is calculated once a minute, one second after a full minute.
- A report is sent once a minute, two seconds after a full minute.

All timers have the same elements:

- Scale: 1 (absolute)
- Type: 1 (periodic)

Timer 1, measurement:

- Interval: 10000
- Synchronization time: 0

Timer 2, statistics using the measurement as input:

- Intervals: Update 10000, Calculation 60000
- Synchronization time: 1000

Timer 3, reporting using both previous values:

- Interval: 60000
- Synchronization time: 2000

Modifying Timers

Lizard Setup Software provides a single view of timed operations in which certain topics are only accessible on the Advanced user level.

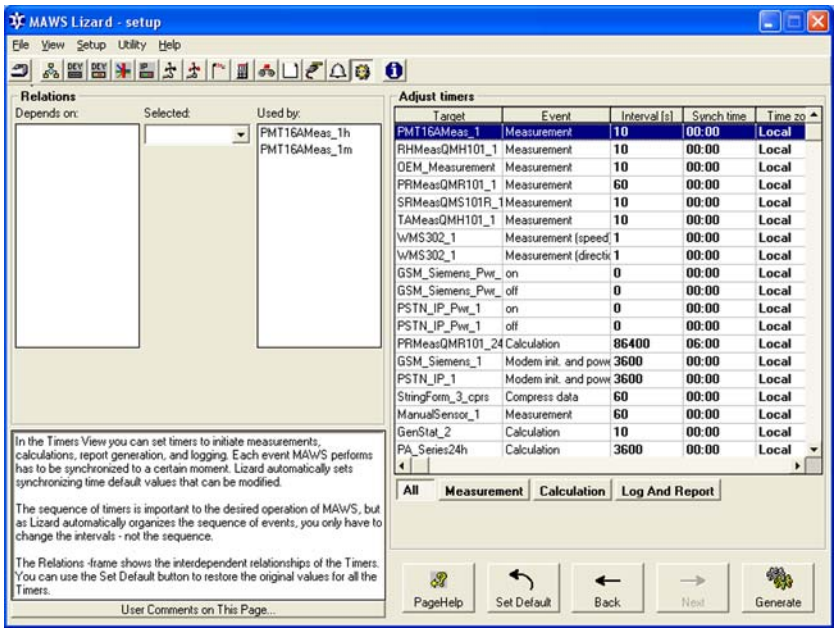

Figure 62 Timers View on Normal User Level

On the Normal user level, you can only modify the intervals of timed events, and the synchronization times are modifiable down to full minutes. The order of execution is always determined by Lizard.

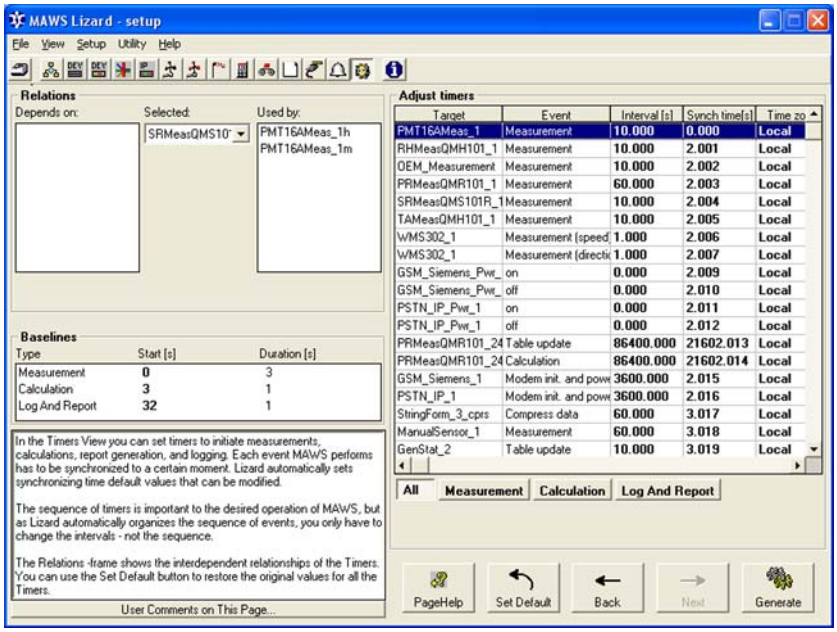

Figure 63 Timers View on Advanced User Level

On the Advanced user level, the synchronization times are modifiable down to milliseconds. The type and scale parameters are also accessible (although not visible in Figure 63 on page 145).

On the left of the **Adjust timers** frame, there is an additional **Baselines** frame, which displays and enables changes to the overall timing of the application. As with other Lizard settings, you can edit the list items in bold print by double-clicking the value to be changed, typing in the new value, and pressing **ENTER** to confirm the change.

Automatic Sequencing Principles

The Lizard component library contains all the necessary timed events with default values for timer parameters, and estimates of the time needed for performing these operations. All the timed events are classified into the following three baselines:

- Measurements
- Calculations
- Logging and reporting

When an application is generated or the **Timers** view is opened, Lizard performs an automatic timer sequencing operation with the following algorithm:

1. Lizard orders the timers into their baselines.
2. Inside each baseline, the interdependence of events is determined, for example, which events have to be executed first to perform the interdependent events. Timed events must be sorted according to this sequence.
3. Following the previously determined order, and using the execution time estimates, Lizard determines the time needed by different baselines, and moves the following ones forward in time accordingly. In a real application this only effects the duration of the measurements. Certain measurements may require, for example, long activation delays, which then causes the following calculations to be delayed. Calculations, logging, and reporting are executed as soon as possible after the measurement cycle has finished.

All automatic sequencing is based on a cycle of one minute (or multiple). By default measurements are started at the full minute, followed by other events as soon as the measurement cycle is complete.

Events with shorter cycles, such as wind measurements and calculations, run several times a minute, but are still synchronized to the other slower events in their one minute frame.

This algorithm is in use unless the user modifies the synchronization times in such a way that seconds become effected. When such a modification is made, the timers are stored with the settings the user has made. Automatic sequencing can be resumed with the **Set Default** function.

Changing Timer Intervals

Timer intervals can be changed simply by entering a new interval in seconds into the corresponding cell.

Threshold-Dependent Timer Intervals

Application execution is mostly controlled by timers, which are set to fixed intervals with Lizard Setup Software.

Threshold-controlled timer intervals provide means to change these intervals according to limit values (thresholds) while the system is running. For example, the following topics can be handled with this control method:

- Power consumption control when operated on backup batteries: the system can keep the communication equipment permanently on when there is external AC power supplied and switch to cyclic powered mode when the system is running on backup batteries.
- Communication cost reduction: When the measured conditions are normal, data can be transmitted less frequently, but when preset limits are exceeded, faster transmission cycles can be taken into use.

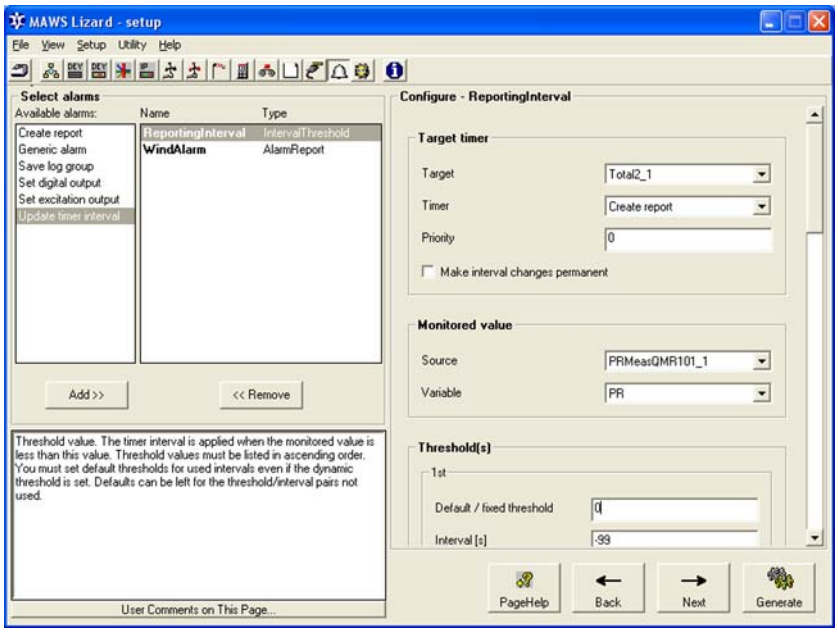

Figure 64 Alarms View: Interval Threshold Configuration

Configure the interval thresholds in the **Alarms** view of Lizard. Figure 64 on page 148 shows a typical setup for managing the transmission frequency of reports. Interval thresholds are configured with the following settings:

- **Target timer**
  - Controlled timed event is selected by **Target** and **Timer**.
  - The optional **Priority** setting can be used if multiple thresholds are used to change the same timer interval. The bigger this value is, the higher its priority. For more information, see section Interval Update Rules on page 150.
  - **Make interval changes permanent** controls whether the updated interval value is stored to static parameters, from where it is read and set as a timer when the system is started.
- **Monitored value**
  - **Source** and **Variable** select the value which is compared against the threshold values.
- **Threshold(s)**
  - This list declares up to five ranges for the **Monitored value**, each of them defining an **Interval** for the **Target timer**. The first range is effective when the monitored value is less than

its threshold value, while the next ones are effective when the monitored value is equal to or higher than the previous threshold and less than its successor. Ranges have to be set in an ascending order, in such a way that the lowest range is first and the highest last. Unused ranges can be left to their defaults.

- Threshold can be fixed by setting the value to **Default/fixed threshold**. Alternatively another variable, for example a static parameter can be used as a threshold. In this case the **Source** and **Variable** fields indicate the source for the threshold, and **Default/fixed threshold** gives a default value which is used if the actual source does not return a valid value.

- **Interval** defines the corresponding timer interval in seconds. If this value is set to 0, the timer is disabled and the timed event never occurs. See section Example of Timer Intervals on page 149.

- **Timer disable input** is an optional parameter which defines a variable for unconditionally disabling the timer. When the defined variable receives a value other than zero, the disable condition evaluates to true and the timed event never occurs.

Example of Timer Intervals

The example view (in Figure 65 on page 150) defines the following intervals for the timer:

- When the monitored value is below 1.8, the interval is set to 3600 seconds (1 hour).
- When the monitored value is equal to or higher than 1.8 and less than 20.0, the interval is set to 900 seconds (15 minutes).

NOTE	The last used threshold value should be set so high that the monitored value never reaches it.

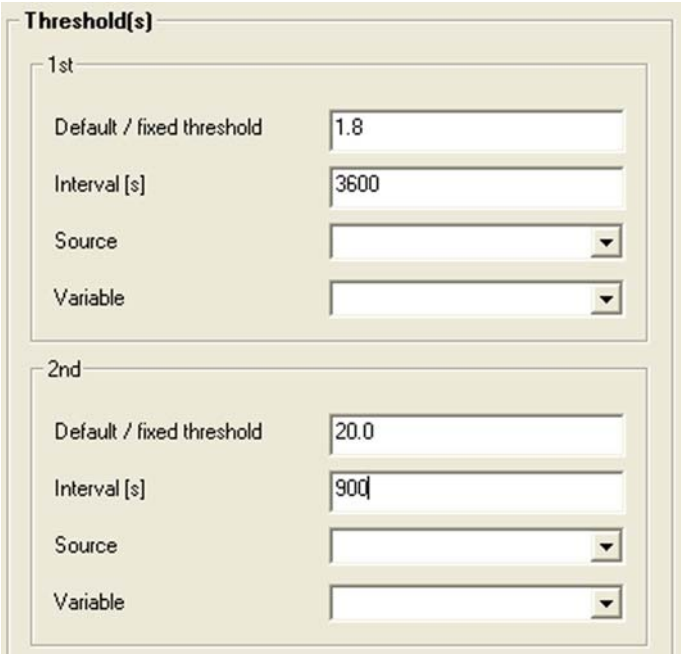

Figure 65 Threshold Definitions

Interval Update Rules

More than one threshold control can be set to modify the same timer. In this case, the following update rules for setting a new interval are applied:

- New interval is shorter than the currently effective one.
- Setting a threshold control has a higher priority than the currently effective one.
- New interval is set by the same threshold control than the currently effective one.
- This is the first update.

NOTE	High priority threshold control can release the timer for others to update by setting the value -1 to the interval.

Changing Synchronization Times of Single Events

You can change the synchronization time of a single event to make the event occur, for example, at a certain time of the day. Proceed as follows:

1. Change the user level to Normal.
2. Double-click the desired synchronization time.
3. Type in the new time in *hh:mm*, or use the two arrows next to the cell.

Changing Synchronization Times of Multiple Events

Default timing is synchronized in such a way that measurements start at full minutes. If, for example, logging or reporting has to be started at a full minute, the **Baselines** frame can be used to re-synchronize a complete set of timers at once. Baselines can be adjusted according to the following rules:

- Baselines must be between -29 to 29 seconds. Setting negative values moves the timed events to occur before the full minute, whereas setting positive values moves the timed events to occur after the full minute.
- Baselines cannot be set to start after the next, or before the previous, event.
- Baselines should not be closer to each other than the time indicated in the **Duration** column of the **Baselines** frame. If the baselines are too close, it may cause incorrect timing sequences. Some calculations may, for example, start before the measurements are completed.

To change a baseline, simply enter a new value to the **Start** column of the **Baselines** frame. Use the **Set Default** function to restore the original calculated values.

Using Static Parameters with Timers

It is often necessary to change the interval or synchronization time of timers. You can define these to be read from static parameters. Static parameters can also be changed at runtime by using the **spset** command.

First, you are recommended to create the parameters to be used in the **Static Parameters** tab of the **Setup** view.

NOTE The **Measure** field has to be changed to *seconds*. In order to change it, double-click the measure field of the static parameter in question, and select *second*.

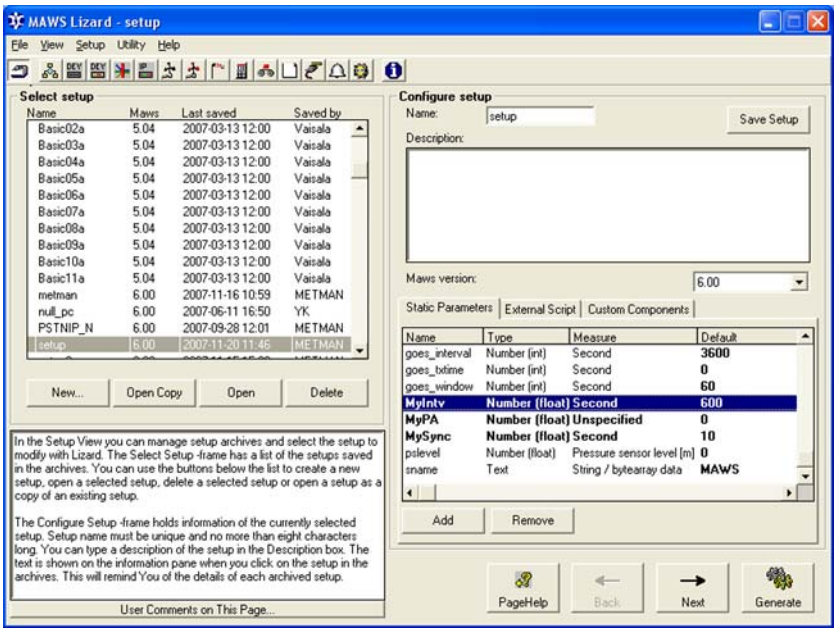

Figure 66 Setup View: Static Parameters Tab

To change an interval or synchronization, proceed as follows:

1. Go to the **Timers** view.
2. Right-click the timer to be modified either in the **Interval** or the **Synch time** column. Select **Advanced edit** from the list. The **Edit Timer** window opens, see Figure 67 on page 153.

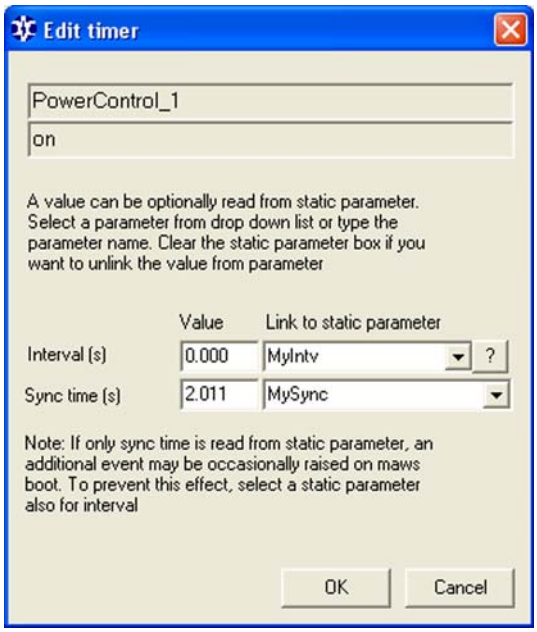

Figure 67 Edit Timer Window

3. Use the buttons to select the static parameters to be used. Only those static parameters whose measure unit is seconds are displayed.
4. Default values are kept until new values are stored into the static parameters.
5. The parameters with a static parameter connected are shown in blue color in the **Adjust timers** frame.

Resetting Sum Calculation Using Alarms

Sometimes it is necessary to reset a current calculation if something unexpected happens. A typical example would be a precipitation calculation, which is handled by the sum calculation. For example, if the QML logger is configured to calculate daily sum for the complete day and something goes wrong with the sensor, it is necessary to reset the current sum calculation during the current calculation interval, so that no wrong or incomplete results are reported. The **Alarm on action** field with the selection *RESET_INTERVAL* is added to the **Generic Alarm** option to perform this action.

In the examples shown in Figure 68 on page 154 and Figure 69 on page 154, the sensor status of WXT510 is monitored. The value of the status is zero if the sensor is working normally, otherwise it is one or greater.

If for some reason the value of the status changes, for example, a wire is broken, an alarm will be generated. This new alarm action causes the current sum of the statistical calculation *SumStat_1* to be reset. This sum calculation will continue only when the new interval begins.

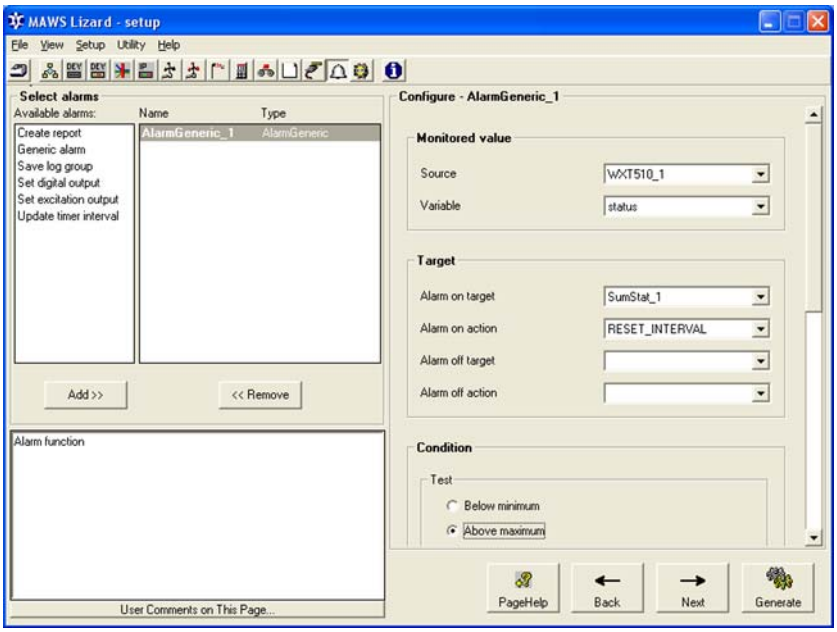

Figure 68 Alarms View: Monitored Value and Target

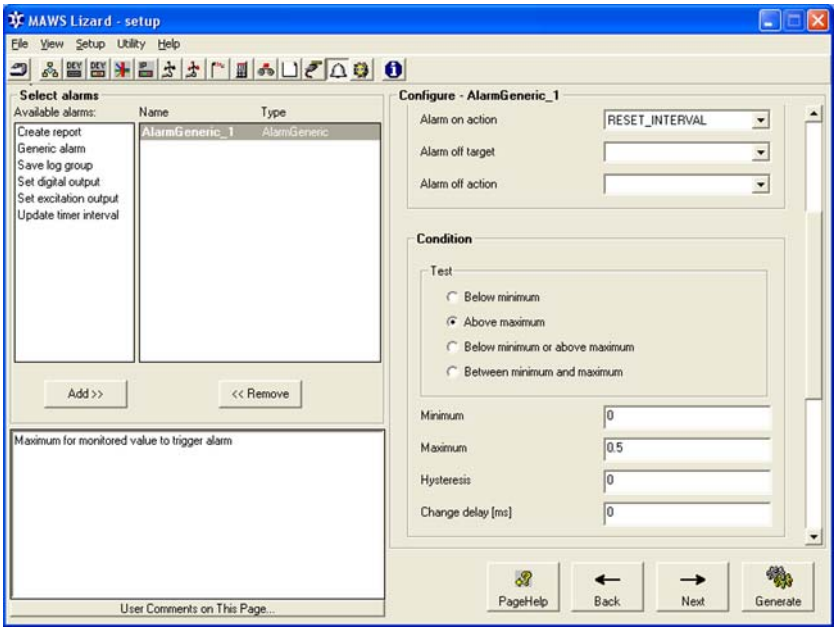

Figure 69 Alarms View: Condition for Generic Alarm

Additional Range Checking

In addition to defining validity checking of the measured sensors (range checks and step checks between consecutive measurements), you can also add these checks for any other data, for example calculated data or data received via serial ports.

To add the value check component, proceed as follows:

1. Go to the **Calculations** view and select **ValueCheck** from the available **Misc** calculations list.
2. Click the **Add** button to insert a new component.
3. Set the required values to parameters listed under **Validation parameters**. Validation parameters are described in Table 22 on page 155.

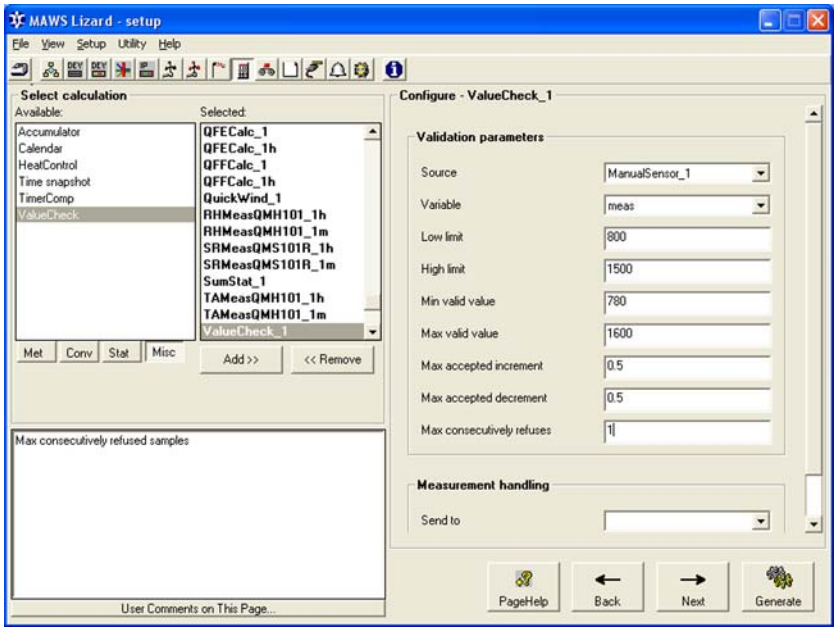

Figure 70 Calculations View: Validation Parameters

Table 22 Validation Parameters

Parameter	Description
Source and variable	Data item to be checked
Low limit	Minimum value this component accepts
High limit	Maximum value this component accepts

Table 22 Validation Parameters

Parameter	Description
Min valid value	If set, this shows the lowest value this component accepts, and the output is clamped to low limit
Max valid value	If set, this shows the highest value this component accepts, and the output is clamped to high limit
Max accepted increment	Shows how much the checked values may increase between two consecutive readings
Max accepted decrement	Shows how much the checked values may decrease between two consecutive readings
Max consecutively refused	Shows how many times consecutive step checks can be exceeded before setting the output as invalid

The diagrams in Figure 71 on page 157 and in Figure 72 on page 158 illustrate the internal implementation of the range and step check validations.

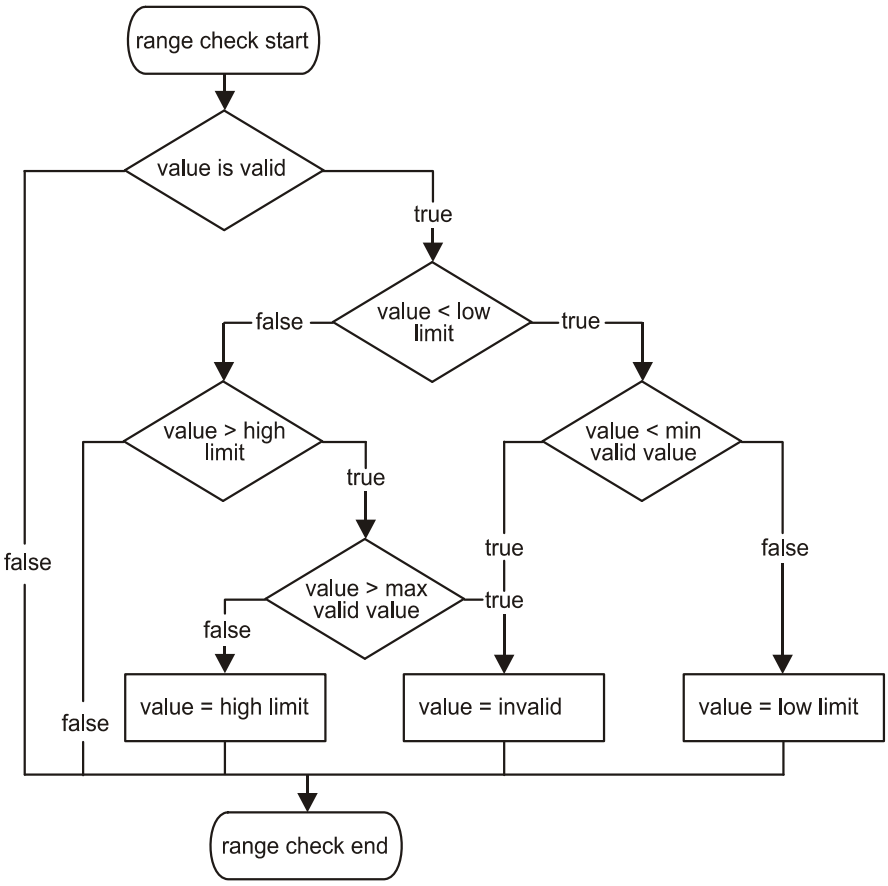

Figure 71 Range Check

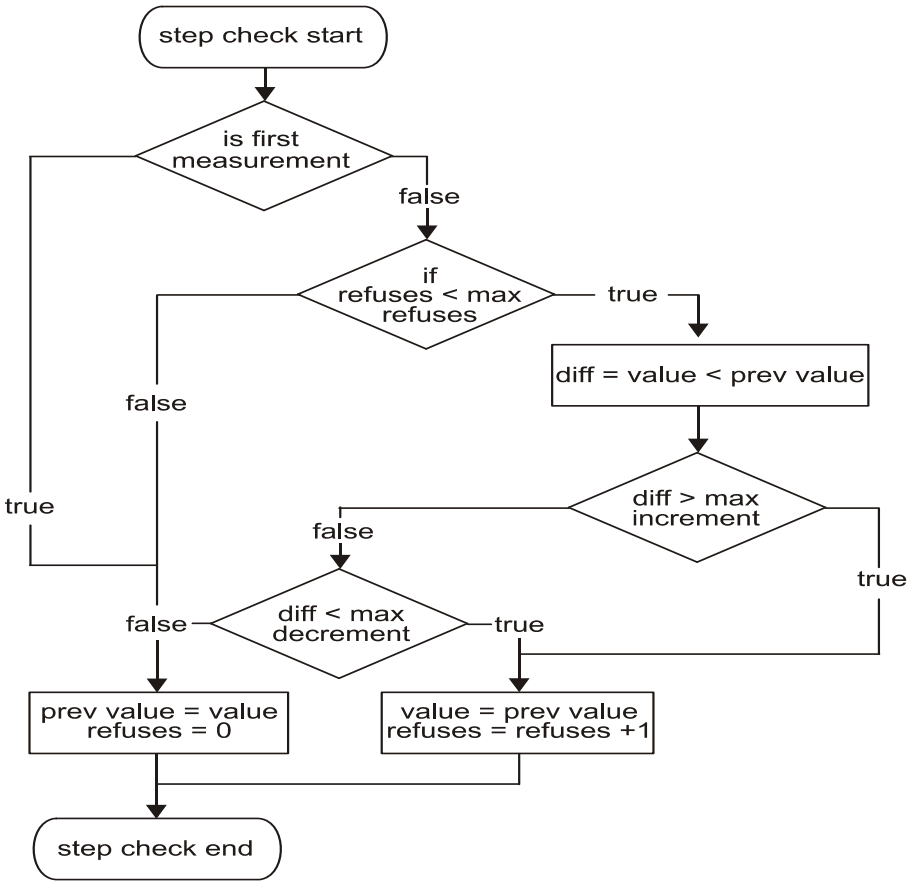

Figure 72 Step Check

Configuring Calculations and Reports

Accumulator with Predefined Reset Time

You can use the **Accumulator** component to add a source parameter to the destination parameter in order, for example, to accumulate annual precipitation in the system and to reset the calculation at a predefined moment.

The destination parameter is stored in the static parameters to maintain its value over reset or power shutdown. In addition, the destination parameter can be reset according to a predefined schedule. The

Accumulator is always incremented when the source variable is measured.

Configuring Accumulator

To select the **Accumulator** component, proceed as follows:

1. In the **Calculations** view, choose Miscellaneous calculations (**Misc**) by clicking on the correct button below the **Available** list box; see Figure 73 on page 159.

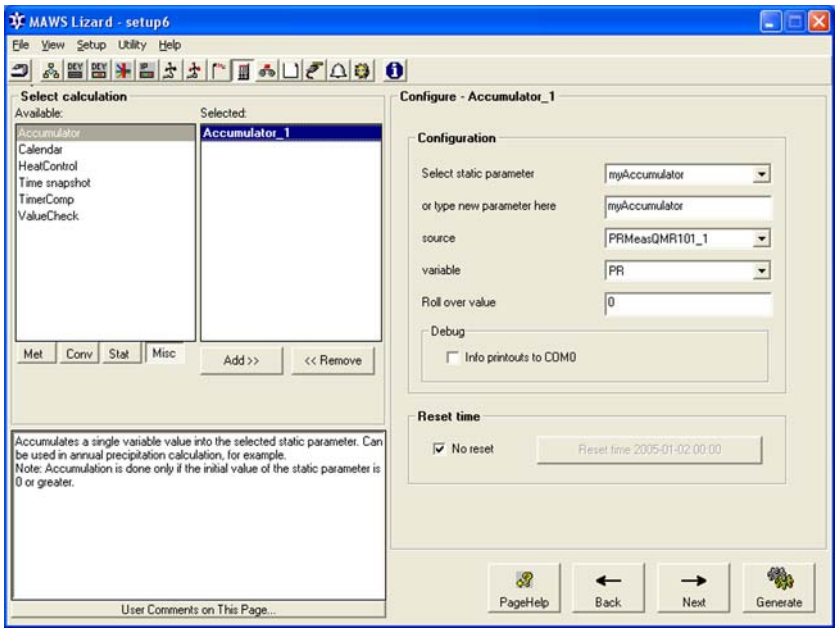

Figure 73 Calculations View: Selecting the Accumulator Component

2. Select the **Accumulator** from the list by clicking on the item name and then the **Add** button.

To configure the **Accumulator**, proceed as follows:

1. In the **Calculations** view, select a static parameter to be used in accumulation from the **Select static parameter** list which lists all the correct static parameters that are defined in the static parameter sheet. If there is no suitable parameter, you can create a new one by typing it manually in the text box.
2. Select the **source** component and source **variable**. The increment source and variable indicate the source parameter to be added to the destination variable.

3. You can also choose a reset option (setting of the static parameter to zero at a selected time) in the **Reset time** frame. If you select the **No reset** option, the destination parameter is incremented indefinitely unless you reset the **Accumulator** manually. If **No reset** is not selected, click on the **Reset time** button to select the resetting schedule. To select the reset schedule, proceed as follows:

   - Select the date and time for the reset in the corresponding frames of the **Select time** view. Use the **Time base** frame to select whether the reset follows **Local** or **UTC** time.
   - Select a reset interval (how often resetting occurs) in the **Recurrence options** frame.

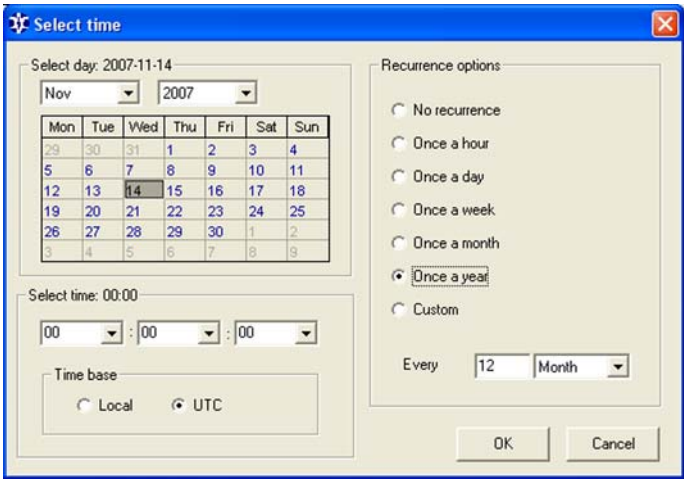

Figure 74 Select Time: Selecting Accumulator Resetting Schedule

If you select reset to occur once an hour, the timing is as with normal timers.

If you select reset to occur monthly and the resetting date is the last day of the month, reset always occurs during the very last day regardless of the number of days in that particular month. For example, for February and leap year, the system automatically reschedules the resetting days 30 and 31 to be the 28th or the 29th, depending on the year.

In the example above, reset occurs once a year on the 14th of November at midnight.

Resetting Accumulator Manually

You can also reset the **Accumulator** manually, that is, assign a positive initial value of zero or greater than zero to the accumulation. In order to reset the **Accumulator** when using the AWS Client software, proceed as follows:

1. Start the AWS Client software, then select the **Settings** menu, then **Parameters** option, then the **Static** option. Alternatively, you can click on the **Set static parameters** icon in the Toolbar; see Figure 75 on page 161.
2. In the **Static Parametes** window, click the **General Settings** icon to expand the menu tree.
3. From the **General Settings** list, select the accumulator parameter; in Figure 75 on page 161, the accumulator is named **precip_days**, suggesting that it represents the accumulated precipitation in the rain gauge.
4. Click **Edit**. The background of the **Value** text field turns white; this means you can change the value of the field.
5. Enter the new parameter value; typically the value is 0.0, but any number grater that zero can be used. Click **Save**.

   The parameter is the one that was entered manually in the text box in the **Configure** frame of the **Calculations** view at the time the Accumulator was configured in Lizard.

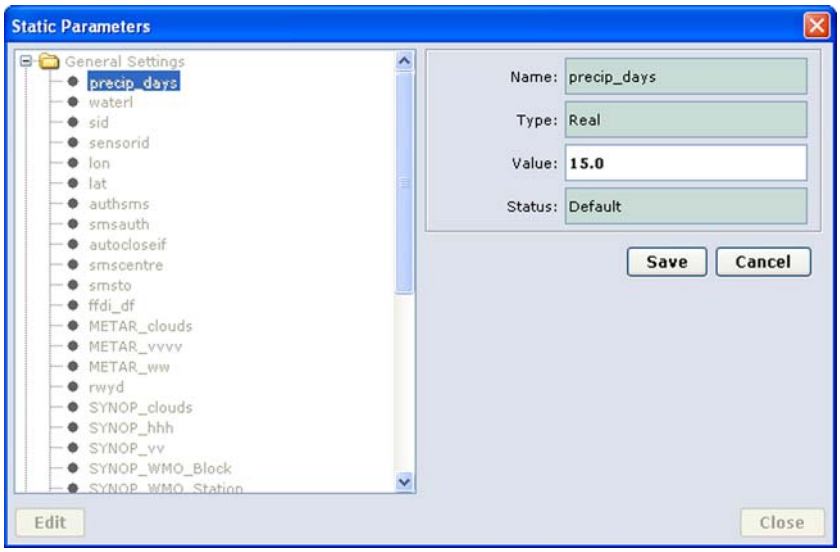

Figure 75 Static Parameters Window: Entering

Accumulator Reset Value Manually

For detailed information on the AWS Client software, refer to Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 1.

If you use some other terminal program in order to reset the **Accumulator**, give the following command:

spset <*static parameter*> [*initial value*]

where

static parameter	=	Name of the static parameter, selected from the **Select static parameter** list or entered manually in the text box in the **Configure** frame of the **Calculations** view.
initial value	=	The initial value you wish to assign for the accumulation. Always enter the value with one decimal place (for example, 0.0).

Using the Accumulator Variable in Reports

To use the **Accumulator** variable in reports, proceed as follows:

1. Select the **Reports** view.
2. Create a new report or select an existing one to include the **Accumulator** variables for the **Accumulator**.
3. Lizard displays the items that are available for the source in question in the **Available** list in the **Select Variables** frame.

   The variable used in accumulation is located under the source name **SParServer**. Click on the plus sign in the **Select Variables** list to display it.

Power Control Option

Power Control is used to control the physical output: either the output pin on the extension board (for example digital I/O module) or an excitation output on the QML logger.

With this option, it is possible to use the same output for several purposes so that the output pin will be active as long as there is one

reservation left. For example, several sensors can use common powering without extremely careful synchronization of timing.

The Power Control option is located in the Lizard **Devices** view.

Configuring Power Control Option

To configure the Power Control option, proceed as follows:

1. Open the **Devices** view.
2. Select *Power Control* from the **Available** list and click **Add**.
3. Select the output to be controlled from the **Connector** list as shown in Figure 76 on page 163.

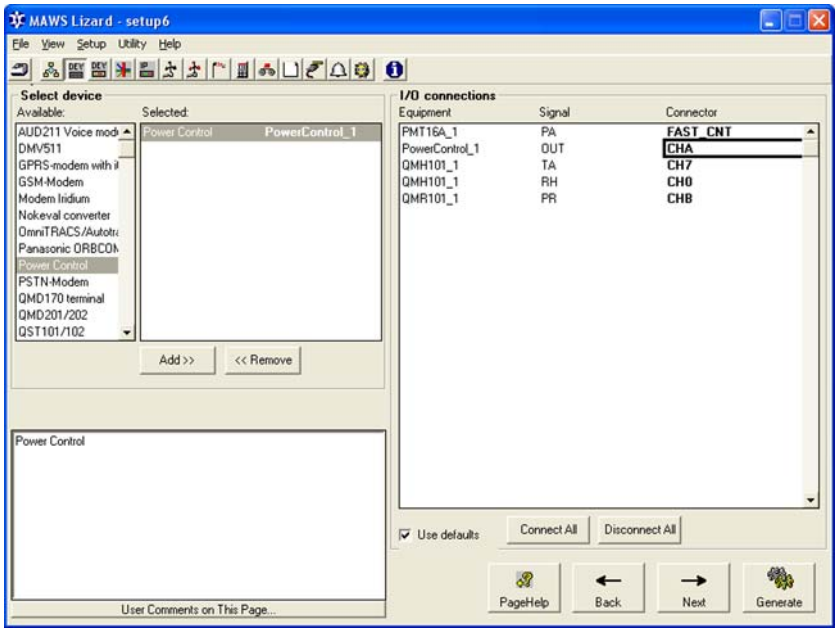

Figure 76 Devices View: Connecting Power Control

4. Proceed to the **Device configurations** view, as shown in Figure 77 on page 164, and configure the polarity and timed-control options.

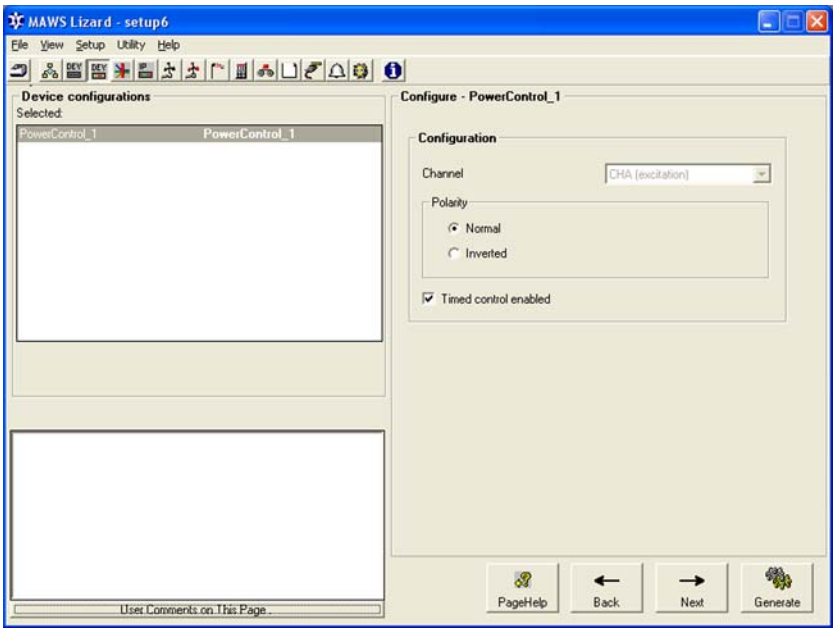

Figure 77 Device Configurations View: Configuring Power Control Option

Timer Option

Timer is used to create timed events that occur at a predefined time at specific intervals. These events resemble the timers in the **Timers** view but are more freely configurable to meet specific needs.

The Timer option is located in the **Misc** list in the **Select Calculation** frame. For a variety of options, see also the **Conv** list.

Configuring Timer Option

To configure the Timer option, proceed as follows:

1. In the **Calculations** view, click **Misc** to list the available options; see Figure 78 on page 165.
2. Select *TimerComp* from the **Available** list and click **Add**.

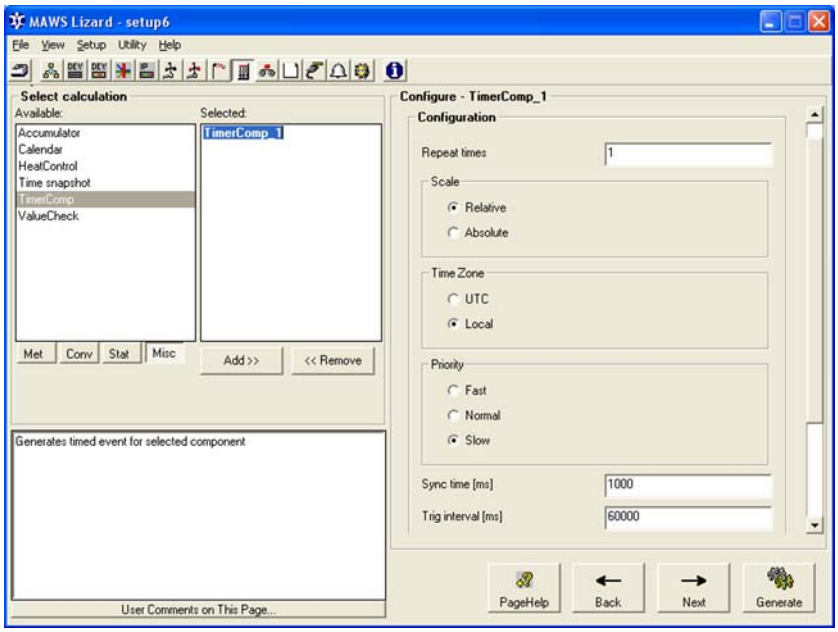

Figure 78 Calculations View: Configuring Timer Option

There are several configuration options in the **Configuration** frame on the right:

Option	Description
Repeat times	Defines how many timed events will be created
Scale	Indicates whether the timed events are tied to absolute time or whether they are relative and only the interval is meaningful
Time Zone	Specifies whether UTC or local time is used to calculate the timed events, if the scale selected is **Absolute**
Priority	Defines the priority of the timer. Typically, **Normal** or **Slow** are the most suitable options. A **Fast** timer should be used only in time-critical actions
Sync time [ms]	Defines the moment that the timed events are tied to (as in **Timers** view)
Trig interval time [ms]	Specifies the interval between timed events (as in **Timers** view)

Enhanced Time Snapshot

The **Time Snap** option in Lizard Setup Software is capable of returning also UNIX time, if requested.

You can use the UNIX time option in Lizard by selecting it from the **Available** list under **Select Variables** in the **Reports** view; see Figure 79 on page 166. Note that in order for this option to appear in the list, you have to select *Time snapshot* first from the **Misc** list in the **Select Calculation** frame of the **Calculations** view.

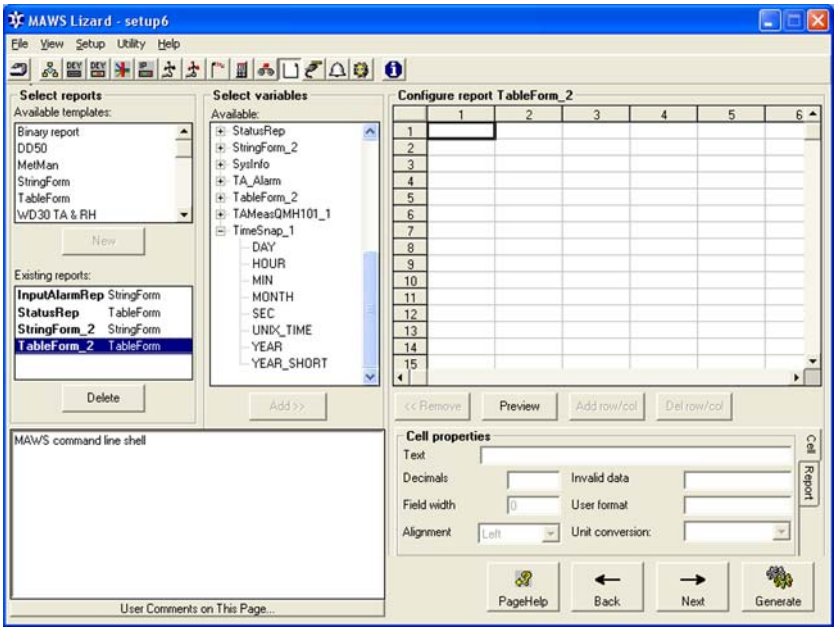

Figure 79 Reports View: UNIX Time Option under Time Snap

Checksum Option in Reports

You can add a checksum into the report that is already in the report configuration. You can also define where the data begins and ends in the checksum calculation as well as format the checksum fields to meet your own requirements.

Creating Checksum Report

To use the checksum option in a report, proceed as follows:

1. In the **Reports** view, open the available variables in the **Select Variables** frame. The configurable checksum report in this example is MyReport; see Figure 80 on page 167.

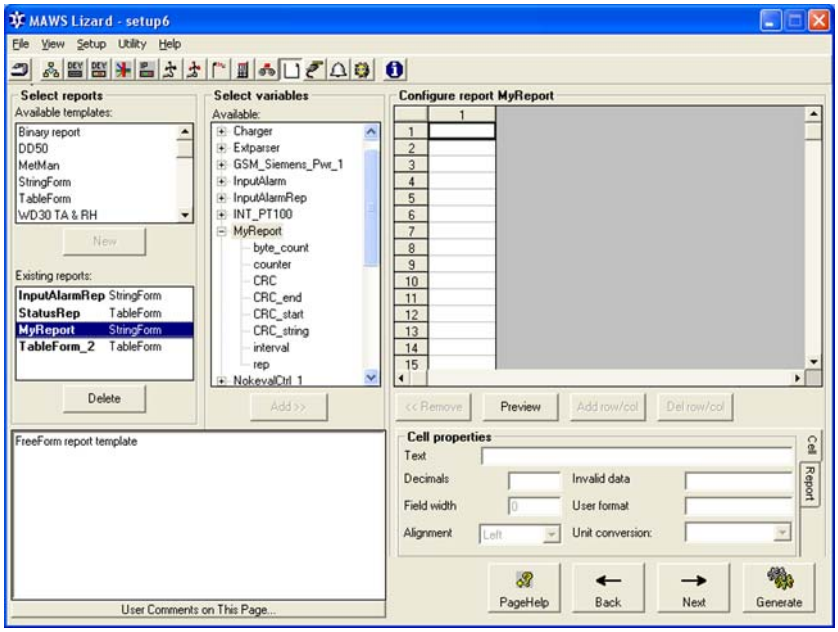

Figure 80 Reports View: Configuring New Checksum Report

There are variables in the list that are used for calculating and showing the checksum:

- **CRC** returns the checksum to be formatted in a User format
- **CRC_start** indicates the start of data to be included in the CRC
- **CRC_end** stops calculating the CRC
- **CRC_string** returns the checksum in an ASCII presentation

To calculate a CRC, proceed as follows. Note that this procedure is an example of a typical case.

1. Go to the **Reports** view as shown in Figure 81 on page 168.

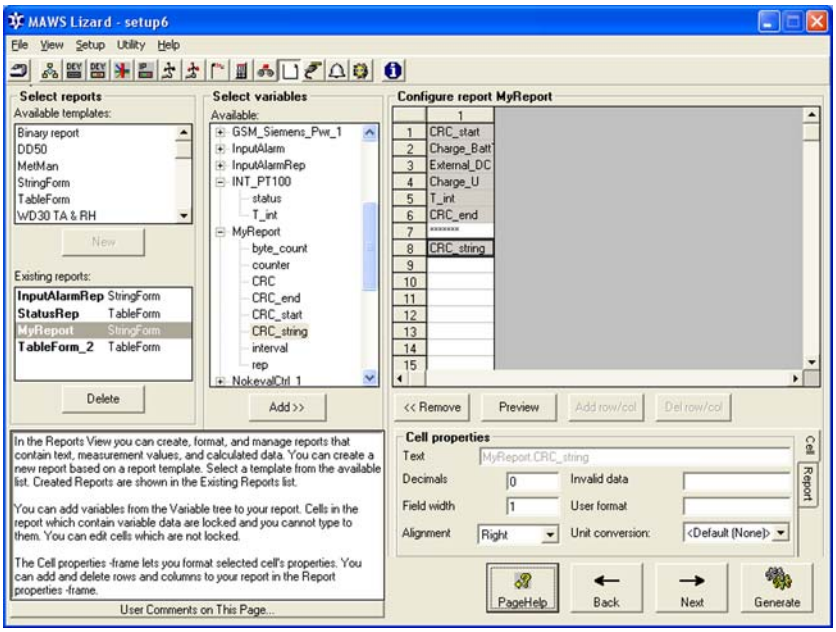

Figure 81 Reports View: Adding CRC

2. For the CRC calculation method, see the **Report properties** frame.
3. Select the **Report** tab on the right and click the **Checksum** button. The **Checksum settings** window opens as shown in Figure 82 on page 168.

   The variables from rows 2 to 5 are taken into account when calculating the CRC.

   The CRC is placed after the ******* string.

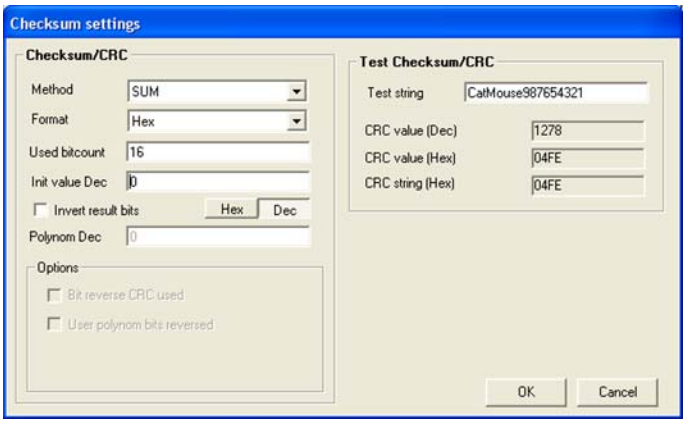

Figure 82 Checksum Settings Window

In the **Checksum settings** window you can define the following parameters:

- Method

Parameter Option	Description
SUM	Calculates a sum from the bytes to be included in CRC
XOR	Calculates an exclusive OR from the bytes to be included in CRC
CRC16	16-bit CRC
CRC32	32-bit CRC
USER CRC	User-defined CRC

- Format

Parameter Option	Description
Hex	Displays the CRC in a hexadecimal format
Hex LSB first	Displays the CRC in a hexadecimal format, Lower byte first
KERMIT	Kermit-style formatting
WXT	Vaisala Weather Transmitter style formatting

- **Used bitcount**, specifies how many bits are used to calculate the CRC. 16 bits is typical for SUM and CRC16; 8 bits is typical for XOR.
- **Init value**, indicates the start value for the CRC, that is, where the calculation is started. This parameter is also known as a seed.
- **Invert results bit**, can be used for bit inversion in the final CRC
- **Polynom Dec**, an informative field
- **Options**

Parameter Option	Description
Bit reverse CRC used	CRC is displayed in a reversed order, the lowest bit is exchanged with the highest bit and so on
User polynom bits reversed	Only available with USER CRC. The lowest bit is exchanged with the highest bit and so on.

On the right of the **Checksum settings** window, under **Test Checksum/ CRC**, you can test how the parameters listed under **Checksum/CRT**

work on a test string for which you know the CRT Dec and Hex values and the CRT Hex string. This way, you will be able to find the correct checksum parameters for the report you are creating.

Binary Report

You can also create binary reports, that is, reports where data is stored as binary instead of visible ASCII characters. It is also possible to pack data so that one data item uses only a limited number of bits.

Creating Binary Report

To configure a binary report, proceed as follows:

1. In the **Reports** view, select *Binary report* from the **Available templates** list and click **New** to create a new report; see Figure 83 on page 170.

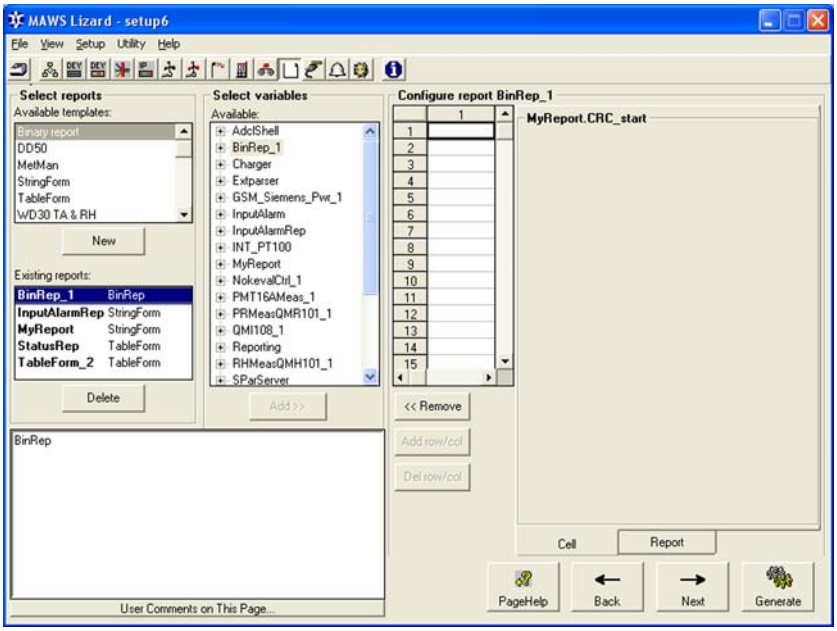

Figure 83 Reports View: Selecting Binary Report Form

A binary report is configured like any other report.

Binary reports differ from regular ones in the formatting of the data items. Each time a new item is added to a report, a formatting frame appears; see Figure 84 on page 171.

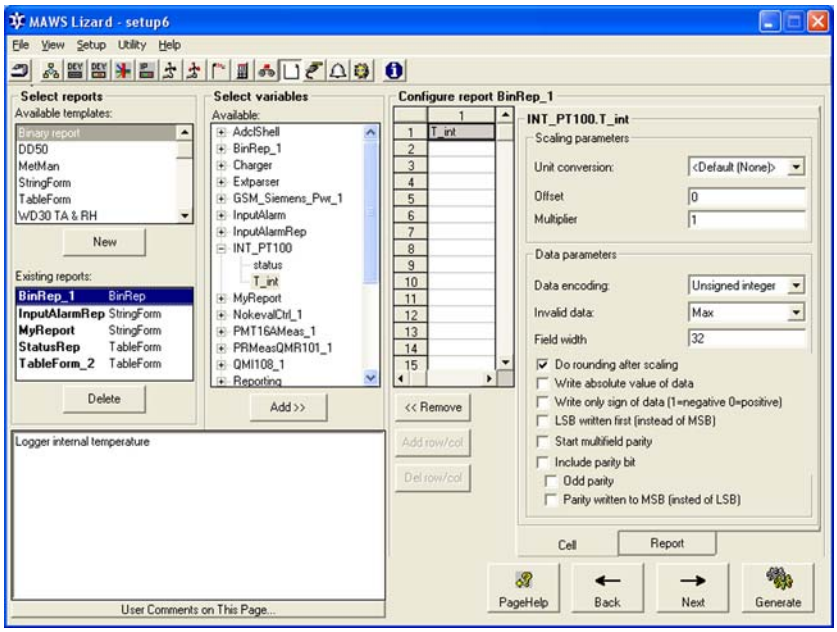

Figure 84 Reports View: Binary Report Formatting Frame (1/2)

Scaling parameters define how the data item will be scaled into the binary report:

- **Unit conversion**, specifies whether the value will be converted to other units, for example from Celsius degrees to Kelvin. This parameter functions in the same way as in a regular report.
- **Offset option**, indicates whether some offset value is added to the value (after a possible conversion).
- **Multiplier option**, indicates whether the value is multiplied (after a possible conversion).

  If scaling is used, the following formula applies: New value = (Value + Offset) × Multiplier.

Data parameters define how the data value is coded in the binary report, for example how many bits are used:

- **Data encoding**, specifies the type of the value. The parameter options are the following:

Parameter Option	Description
Unsigned integer	Presents the value as a positive integer number
Integer	Presents the value both as a negative and a positive integer value
Float	Presents the value as a floating point number using 4 bytes: sign bit, 8-bit exponent, 23-bit mantissa
Double	Presents the value as a floating point number using 8 bytes: sign bit, 11-bit exponent, 52-bit mantissa
BCD	Presents the value as a binary code decimal

- **Invalid data,** used to indicate which value will be presented in the data field when the source parameter is invalid. The parameter options are the following:

Parameter Option	Description
Ignore	Encodes the invalid input value as it is
Zero	Used as an invalid value
Min	Specifies the lowest value in the encoding range as the invalid value
Max	Specifies the highest value in the encoding range as the encodable value

- **Field width**, defines how many bits are used to encode the value. It is possible to use less bits than the data encoding value would require. For example, if 11 bits are used for an integer, only those 11 bits are stored in the binary report.
- **Do rounding after scaling**, indicates that the value is rounded to the nearest integer (after unit conversion and scaling).
- **Write absolute value of data**, indicates that negative values are multiplied by -1.
- **Write only sign of data**, indicates that only a polarity bit is displayed for data item. The polarity bit is zero if the data item is equal to or more than zero (positive value of the data item). Otherwise the polarity bit is one (negative value of the data item).
- **LSB written first**, indicates that the number is displayed in a reversed order (INTEL presentation).

- **Include parity bit**, indicates that a parity bit is added to this field to assure data validity. This option increases field length by one. See below for a description of the parameter options:

Parameter Option	Description
Odd parity	If selected, odd parity is used; otherwise even parity
Parity bit is written to MSB	Indicates that the parity bit is the most significant bit; otherwise the least significant

For information on how to add a checksum, see section Checksum Option in Reports on page 166. In binary reports, the CRC option should be used instead of CRC_string.

There are also parameters that you can retrieve from the binary report component in the **Select Variables** frame; see Figure 85 on page 173.

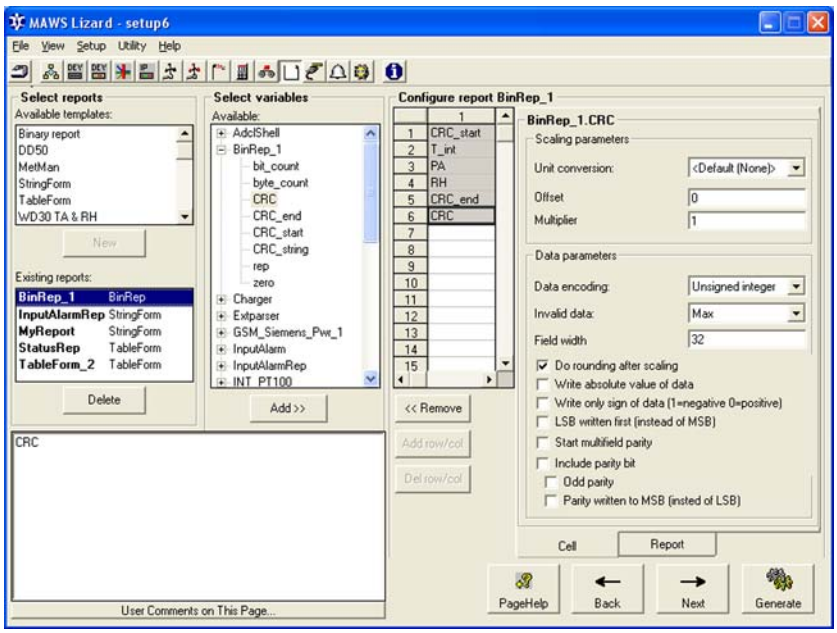

Figure 85 Reports View: Binary Report Formatting Frame (2/2)

- **Bit count**, indicates how many bits are included in this report
- **Byte count**, indicates how many bytes are included in this report

- **Zero**, return number zero. This parameter can be used to add a constant into the binary report. Offset and multiplier are used to set a constant using the following formula:

  constant = (Zero + Offset) × Multiplier(=1)

Additional Features

This section provides information on other features or enhancements to Lizard Setup Software.

Floating Point Numbers in Static Parameters

In early QML logger software versions, floating point numbers were stored in the static parameters as 32-bit floating point numbers (**float**).

From MAWS version 5.01 onwards, the floating point numbers use a 64-bit floating-point number (**double**).

Enhanced Generic Frequency Measurement

The QML logger includes an enhanced generic frequency measurement feature. You can select between two frequency measurement modes that are optimized for their respective ranges:

- Low frequency: frequencies up to 2 kHz
- High frequency: frequencies up to 20 kHz

In the **Measurements** view, use the **Frequency mode** frame to select the optimized range; see Figure 86 on page 175. For more information, see also the online help in the information pane.

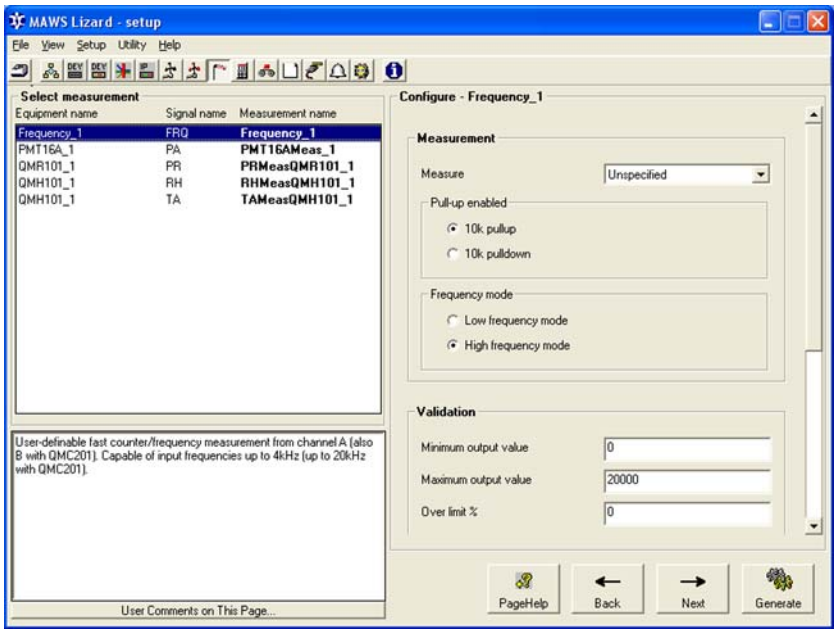

Figure 86 Measurements View: Selecting Frequency Mode