PicoLog

Data logging software

User's Guide

plw.en r5

Contents

plw.en r5

1   Introduction

1.1   Online help

All the dialogs and windows in PicoLog have some associated help information. To receive help in the context of a dialog, click the **Help** button in the dialog. To receive help in the context of a window, click [?]. For a step-by-step introduction to the software, select **Guided tour** from the **Help** menu. Alternatively, with the help file open, do one of the following:

- Click on the **Contents** tab and choose a chapter for browsing
- Click on the **Index** tab and search on a keyword
- Move on to the next topic by clicking the **>>** button

1.2   Overview

PicoLog is a data acquisition tool that collects, records, displays and analyzes measurement data. It has the following capabilities:

- Supports any Pico converter up to the PicoScope 3000 Series
- Collects blocks of data at high speed from a single converter
- Collects data at low speed over long periods from multiple converters
- Allows you to adjust alarm settings [36] for measurements you want to take
- Enables you to apply parameter scaling [35], using equations or tables
- Includes built-in scaling for any Pico Signal Conditioner [27]
- Allows you to edit calculated parameters [39]
- Can analyze other files during data collection
- Displays data during slow collection and after collection
- Graphical display, if you activate the PLW XY Graph [10] window or PLW Graph [8] window, and spreadsheet display if you activate the PLW Spreadsheet [11] window
- Transfers data to other applications via clipboard, file or DDE [123]
- Transfers data between computers using IP sockets [117]

1.3   Recording

The recording mode and repeat functions are selected using the **Recording** 24 dialog. PicoLog can record in the following ways:

- **Real time continuous.** This offers continuous recording over long periods. The data can be displayed in graphical or spreadsheet format during data collection. The fastest sampling rate in realtime mode depends on the speed of the computer and the operating system (it is of the order of a few milliseconds).

- **Streaming (single converter only).** This mode records data continuously over long periods, but allows more accurate timing than real time continuous mode, with up to 1 M samples and sample periods down to 1 μs. Only the following devices support streaming mode: PicoScope 2000 Series and 3000 Series, PicoLog 1000 Series, ADC20/24, and USB DrDAQ.

   In streaming mode, the converter transfers data in blocks and the program updates the display only at the end of each block. This means that the display does not update as smoothly as in real time continuous mode. When the sampling rate is very slow, the time between screen updates can be several seconds.

- **Fast block (single converter only).** This is used to collect a relatively short block of data at high speed. It is not possible to display data during block mode recording. In block mode, it is possible to start recording on a trigger event. If the 'repeat immediately' option is selected, it is possible to write a run file for each occurrence of the trigger event.

There are several options to specify what should happen at the end of a run when the specified maximum number of samples have been collected. The options are as follows:

- Stop
- Repeat immediately
- Scroll
- Repeat after delay

Note: When PicoLog is installed with the (parallel port) DrDAQ 114, the recording mode is fixed at Real time continuous, and the repeat functions are not available.

1.4   Types of measurement

PicoLog can log up to 250 different types of measurement at the same time from up to 20 converters. These measurements can be made up of a variety of readings:

- Single readings, normally in volts, measured by a converter
- Multiple values obtained by analysing a set of converter measurements, for example, AC voltage or frequency
- Calculated values derived from one or more converter measurements, for example, power calculated from amperes x volts

Values obtained from a set of readings take some time to measure, so they can only be used in Real time continuous 2 mode, when the sample time is greater than QuickSampleMs 118.

Measurements are added by first selecting a converter, then specifying what the channels on the converter are to be used for. Different converters have different settings, so the dialogs to set up a measurement are different for each converter. The fast converters have three different dialogs: one for real time mode, one for block mode and one for streaming mode.

The following options apply to all converters:

- Parameter options 34: range, unit and decimal place preferences
- Alarm settings 36
- Signal Conditioner 27 options
- Parameter scaling 35: scaling for other types of sensor, using table lookup or equations

1.5 Legal information

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1.6 Safety warning

DO NOT connect the ground input of the converter to anything which may be at some voltage other than ground, as you may risk damage to the ADC and your computer. Furthermore, if you connect the converter ground to something which is live, your computer chassis may become live.

If in doubt, check by connecting a channel input to the doubtful ground point, and check that there is no significant AC or DC voltage.

We strongly recommend that you read the general safety information in your installation guide and also the product-specific safety warning in the product manual before using your product for the first time.

2 PicoLog components

2.1 Introduction

PicoLog is made up of a number of separate components, but you need only activate the components that you wish to use. As a result, the screen is not cluttered with data that you are not using and the computer can easily be used for other applications whilst you are recording.

The following application components are available:

PLW Recorder 6. Enables you to start and stop recording and to specify recording files, the measurements currently being taken and the alarm state.

PLW Player 7. Enables you to scroll quickly and easily through stored files to compare results on successive runs.

PLW Graph 8. Shows the readings for single or multiple measurements over a period of time.

PLW XY Graph 10. Shows the readings of one measurement against another, on the same graph.

Spreadsheet 11. Shows detailed or summary information in a format which can be copied to a clipboard.

**Notes** 12. Enables you to enter information for a particular run.

When you start PicoLog in recorder mode, the computer displays the recorder application. The player application and display windows can be selected from the Window menu.

When you start PicoLog in player mode, the computer displays the player application. The recorder application and display windows can be selected from the Window menu.

2.2   PLW Recorder

When you start PicoLog using the **Recorder** icon, the computer displays the monitor window, which looks like this:
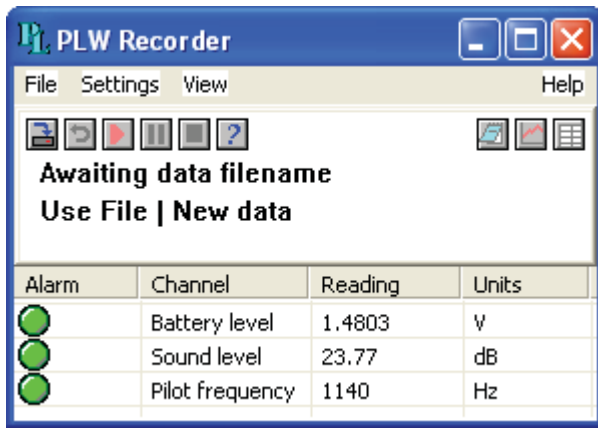
At the top is a menu bar containing the **File** 21, **Settings** 22, **View** 22 and **Help** menus. Below the menu bar are two sets of controls, the Recorder controls and the Window controls.

Recorder controls

New file. Specify a new file to record to.

Re-record. Rewind the current file so that it can be re-recorded.

Start recording.

Pause/resume.

Stop recording.

Help. Access the help information for the recorder window (this page).

Window controls

The second group of buttons, on the right, is used to open other windows:

View Notes. Open a **Notes** 12 window.

View Graph. Open a **PLW Graph** 8 window.

View spreadsheet. Open a **Spreadsheet** 11 window.

Range indicators

The lower pane of the window contains a line of information for each selected measurement. At the beginning of each line is an indicator lamp that signals the current status of the readings taken by PicoLog:

The measurement value is within range

The measurement value is currently out of range, but has not been out of range long enough to trigger an alarm

The measurement value is in an alarm state. To cancel the alarm, use the mouse to click on the lamp

The measurement value is in an alarm state, but the alarm has been cancelled

Next to each lamp is the name of the measurement and its current value. If you click on a measurement name, the computer will display the details of the measurement.

2.3   PLW Player

When you start PicoLog Player, or you select **Player** from the **View** menu of **PicoLog Recorder**, the computer opens a new window like this:

This shows you the name of the current **Player** file and the number of samples taken so far.

Player controls

The buttons on the left are used to specify a filename and to go forwards or backwards in a file sequence. The controls are as follows:

Open file. Load a new file into the player.

Back a file. Go to the previous file in a sequence.

Forwards a file. Go to the next file in a sequence.

Window controls

The buttons on the right are used to open other windows:

View Notes. Open a **Notes** 12 window.

View Graph. Open a **PLW Graph** 8 window.

View spreadsheet. Open a **Spreadsheet** 11 window.

2.4   PLW Graph

From the **View** 22 menu of **PicoLog Recorder** or **Player**, select **Graph**.

Note that there are several graph options 40 that affect the way that the graph is displayed and the format of the axis scales.

The group of horizontal buttons in the top right corner of the screen selects what time interval is displayed:

Scroll left. Move a whole display left.

Scroll quarter left. Move a quarter display left.

Expand horizontal axis. Magnify the middle half of the display to fill the whole width.

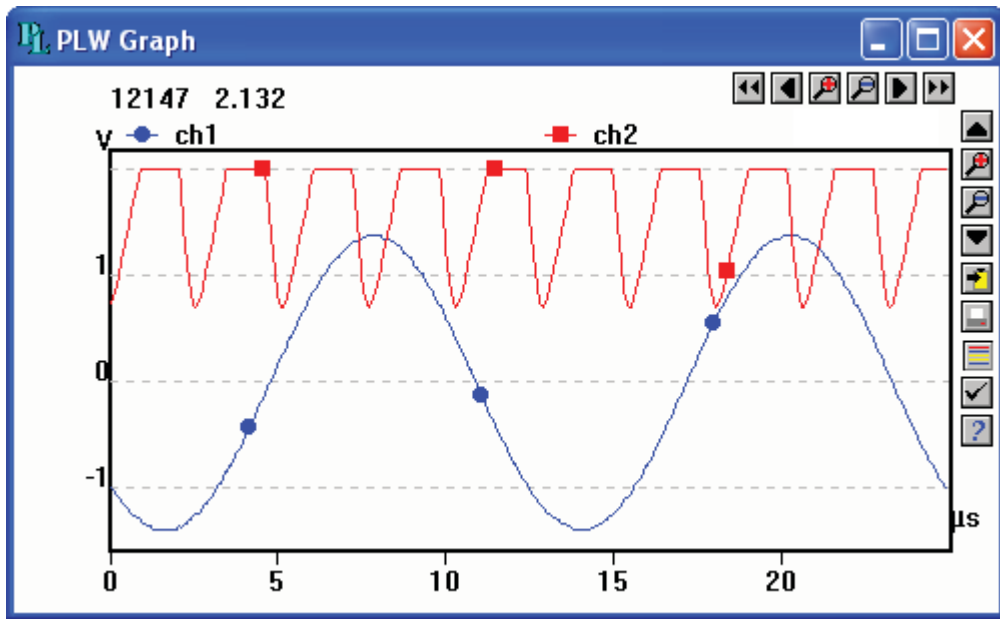**Shrink horizontal axis.** Shrink the current display to half size, so that more is displayed before and after.

Scroll quarter right. Move a quarter display right.

Scroll right. Move a whole display right.

The upper group of vertical buttons controls the vertical range displayed. If there is more than one graph frame, the buttons control the frame with the thicker border. To switch to a different frame, point inside the new frame with the cursor and click the left mouse button.

Scroll up. Move a whole display up.

Expand vertical axis. Magnify the middle half of the display to fill the whole height.

Shrink vertical axis. Shrink the current display height to half size, so that more is displayed above and below.

Scroll down. Move a whole display down.

Note that if you use these controls to change the time or vertical range, auto-scaling for that axis is turned off automatically. Use the options to turn auto-scaling back on again (see button below).

The remaining vertical controls are:

Copy to clipboard. Copy the graph to the clipboard.

Print view. Print the graph.

New file. Write graph to file in .bmp, .jpg, or .wmf format.

Select parameters [37]. Select the parameters, channels or measurements to display on the graph. You can display up to 20 parameters on a single graph.

View options [40]. Specify the options for the graph.

Help. Access the help info for the graph window (this page).

If you move the mouse cursor onto the graph part of the screen, the computer will display the measurement value and time at the current cursor position. If you click on the graph, the graph will zoom in, centred on the selected point. If you right-click on the graph, the graph will zoom out, centred on the selected point.

2.5   PLW XY Graph

From the **View** 22 menu of PicoLog Recorder or Player, select **XY Graph**.
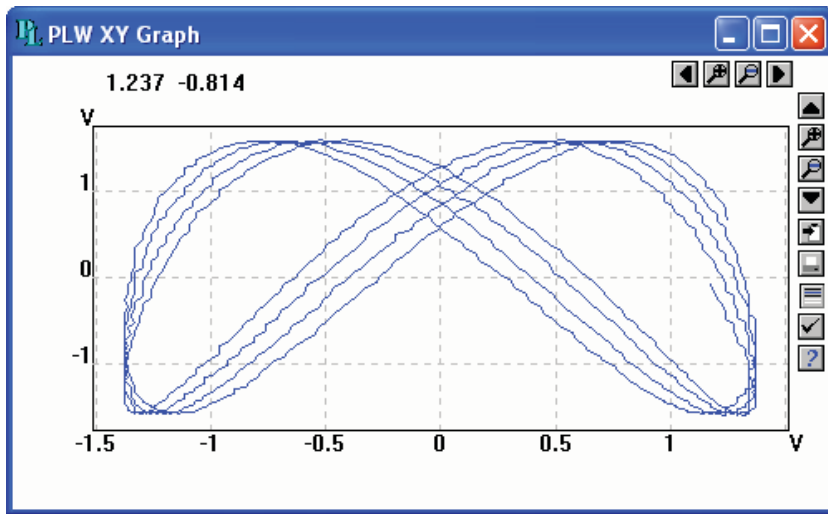
There are several buttons in the top right corner of the screen. The top row of buttons controls the horizontal range displayed:

Scroll quarter left. Move a quarter display left.

Expand horizontal axis. Magnify the middle half of the display to fill the whole width.

Shrink horizontal axis. Shrink the current display to half size, so that more is displayed.

Scroll quarter right. Move a quarter display right

The upper group of buttons in the column on the right controls the vertical range displayed:

Scroll up. Move a whole display up.

Expand vertical axis. Magnify the middle half of the display to fill the whole height.

Shrink vertical axis. Shrink the current display height to half size, so that more is displayed above and below.

Scroll down. Move a whole display down.

Note that if you use these controls to change the horizontal or vertical range, auto-scaling for that axis is turned off automatically. Use the options to turn auto-scaling back on again (see buttons below).
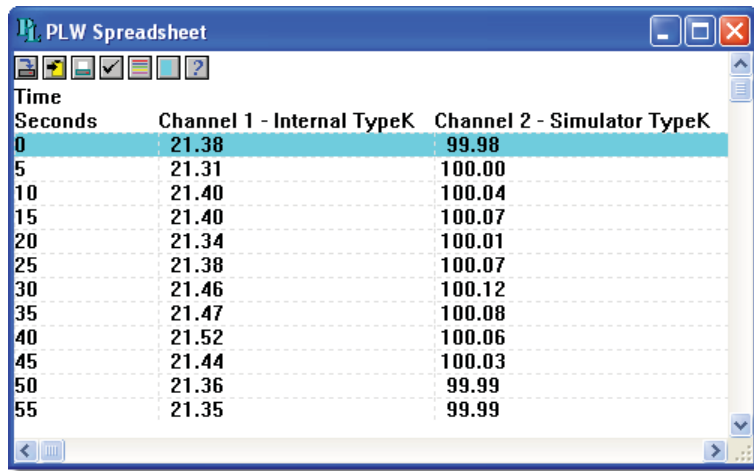
The remaining vertical controls are:

Copy to clipboard. Copy the graph to the clipboard.

Print view. Print the graph.

Select channels. Select the measurements to display on the XY graph (only two).

View options. Specify the options for the graph.

Help. Access the help info for the graph window (this page).

If you move the mouse cursor onto the graph part of the screen, the computer will display the measurement values at the current cursor position.

2.6   Spreadsheet

From the **View** ⟨22⟩ menu of PicoLog Recorder or Player, select **Spreadsheet**.

There is one line for each reading. The first column shows the time in seconds, while the remaining columns show the selected measurements.

The following options buttons are available:

Select channels. Select the measurements to display.

View options. Spreadsheet options specify whether to display individual readings, or first reading, average, minimum and maximum for a period.

If you select a range of readings, you can use the following buttons:

Write to disk. Write the readings to a print file (.prn) or a text file (.txt) - Both are tab separated value files.

Copy to clipboard. Write the readings to the clipboard.

Print view. Print the graph.

You can select a range in one of three ways:

If all of the readings that you want to select are on the screen:
- Point the mouse at the first reading
- Press and hold down the left mouse button
- Drag the mouse to the last reading (the selected readings will be highlighted as you go)
- Release the left mouse button

If the readings are a long way apart:
- Point the mouse at first reading
- Click the left mouse button (this will highlight the first reading)
- Scroll down to the last reading
- Point at the last reading
- Press the shift key and click the left mouse button

If you wish to select all of the readings:
- Point the mouse at any reading
- Click the left mouse button (this will highlight the reading)
- Click on the 'select all' icon:

2.7   Notes

From the **View** 22 menu of PicoLog Recorder or Player, select **Notes**.
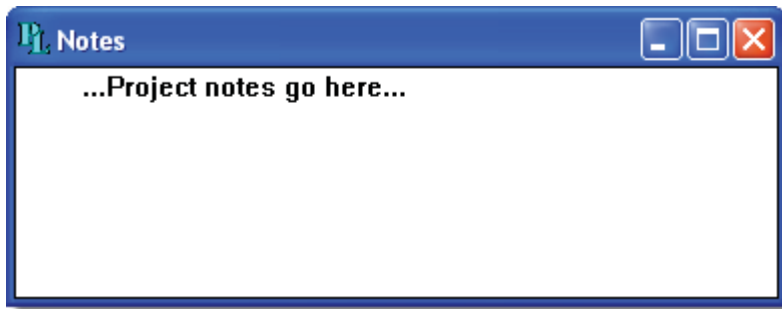
This window enables you to enter information for a particular run. This is useful if you carry out a number of similar runs. The report title can be the same for every run, but the notes contain information specific to each run.

If you have a **Notes** window open when you use the player to browse through several runs, the notes for each run will be displayed. The notes also appear on printed reports.

3   How to...

3.1   Add new measurements

If you are using a Pico signal conditioner, see Signal Conditioners⌐117⌐.

If you are using some other sensor:

1. Select the converter in the normal way
2. At the measurement list dialog, select **Add** (for the ADC-16, for example, this would be the **ADC16 Channels**⌐53⌐ dialog)
3. Enter the details for the measurement
4. Click the **Options** button
5. Click the **Scaling** button
6. Enter the scaling details (see **Parameter scaling**⌐35⌐ dialog for details).

3.2   Select which measurements to display

When you first open a graph or spreadsheet window, the computer displays only the first measurement. To select a different measurement or to add further measurements:

1. Click on the **Select channels** button: ▦. The computer will display the **Select parameters**⌐37⌐ dialog, with a list of all of the measurements and which ones are in use
2. Click on each measurement that you wish to be active
3. Click **OK**

3.3   Start a new run

To start a new run from scratch, select **New settings** from the **File** menu. PicoLog will take you through the steps necessary to define what you want to collect:

- Recording⌐24⌐ method (real time continuous⌐2⌐, streaming⌐2⌐ or fast block⌐2⌐) - not applicable on DrDAQ⌐114⌐
- Sampling Rate⌐25⌐, including sampling interval and maximum number of samples
- Converter details⌐28⌐
- Measurement setup. If you are using the ADC-11, for example, the computer will display the **Edit ADC11 Measurement**⌐49⌐ dialog

Once you have entered these details, check that the monitor window in PLW Recorder⌐6⌐ is displaying the measurements that you wish to record, and that the correct values are showing.

1. If you are in PicoLog Player, from the **View** menu, select **Recorder**, otherwise go straight to step 2
2. The **PLW Recorder**⌐6⌐ window has buttons like a tape recorder, to start, stop, rewind etc.
3. Click on the **New file** button: ▤
4. Type the name of the file to which you wish to record
5. Click **OK** (the filename will appear in the recorder window)
6. Click the **Start recording** button: ▶

The sample number will increase every sample interval.

3.4   Repeat an existing run

If you have just recorded a run, and you wish to retain the data, yet start a new run:

1. Click on the **New file** button: . The computer will display the next sequentially numbered file name.
2. If you do not wish to use the default filename, type in a different name.
3. Click **OK**
4. Click the **Start recording** button:

If you have just recorded a run, and you wish to discard the data and start a new run:

1. Click the **Re-record** button:
2. Click the **Start recording** button:

If you wish to repeat a run:

1. From the **File** menu, select **Open**.
2. Select the file that you wish to repeat.
3. From the **View** menu, select **Recorder**. This displays the recorder window.
4. Proceed according to the retain or discard options described above.

3.5   Start recording whenever Windows starts

First, save the settings for the type of run that you wish to start:

1. Define the type of run that you wish to carry out
2. Select **Save as...** from the **File** menu
3. Type in a filename for these settings
4. Change the file type to `.pls`
5. Click **OK**

Then:

1. Click the Windows **Start** button
2. Select **Settings** or **Control Panel**
3. Select **Taskbar and Start Menu**
4. Click **Start Menu**
5. Click **Add**
6. Type `c:\PICO\plw32.exe -r settings.pls` (or whatever your settings file is called) and click **OK**
7. Select the startup folder (programs in the startup folder are run automatically when Windows starts) and click **OK**
8. Click the **Finish** button

3.6   Display data

To display the data in graphical or spreadsheet format, you should first Start a new run 13.

You can then display the data by clicking on the appropriate button in the recorder window:

  View Notes. Opens a **Notes** 12 window.
  View Graph. Opens a **Graph** 8 window.
  View spreadsheet. Opens a **Spreadsheet** 11 window.

Alternatively, select the window type from the **View** menu.

3.7   Print data

To print a graph:
1. Open a graph window
2. Alter the settings to display the data that you wish to print
3. Click the **Print view** button:

To print a spreadsheet:
1. Open a spreadsheet window
2. Alter the settings to display the measurements that you wish to print
3. Point at the first reading that you wish to print
4. Click the left mouse button to highlight the reading
5. Point at the last reading that you wish to print
6. Hold down the shift key and click the left mouse button to highlight the whole block
7. Click on the **Print view** button:

3.8   Export data to a spreadsheet

To export data to a spreadsheet:
1.   Open a PicoLog spreadsheet window
2.   Alter the settings to display the measurements that you wish to export
3.   Point at the first reading that you wish to print
4.   Click the left mouse button (this reading will be highlighted)
5.   Point at the last reading that you wish to print
6.   Hold down the shift key and click the left mouse button (the whole block will be highlighted)
7.   Click the **Copy to clipboard** button:
8.   Move to the spreadsheet program
9.   Point at the top left of the area you wish to fill
10. Select **Paste** from the **Edit** menu

Alternatively, you can click the **New file** button, , then write the data to a text file. You can then import the text file into a spreadsheet.

If you wish to have the readings in the spreadsheet updated continuously with the current readings, you can use DDE|123|.

3.9   Export a graph to a word processor

To export a graph to a word processor:
1.   Open a graph window
2.   Alter the settings to display the graph that you wish to export
3.   Click the **Copy to clipboard** button:
4.   Move to the word processor program
5.   Point at the place to insert the picture
6.   Select **Paste** from the **Edit** menu

Alternatively, you can click the **New file** button: , then write the data to a `.wmf` file. You can then import the graphics file into the word processor.

3.10   Enable date and time scaling on a graph

The time axis of a graph normally shows the time (in the selected sample interval units) since the start of the run. Whilst this is convenient for short runs, it is not ideal when collecting data over longer periods.

1.   Click on the **View options** button: ☑
2.   Change the time format to **Date/Time**

Other axis scale formats can be selected in the same way - see the **Graph options** 40 dialog for more details.

3.11   Set up the Ethernet Utility

The following products support both Power-over-Ethernet (PoE), and viewing by remote access (using PicoLog). There may be security firewalls in place that prevent remote access. You would need to speak to your IT department about these in order to allow viewing by remote access.

- USB PT-104
- PicoLog CM3 Data Logger

To setup both Power-over-Ethernet (PoE), and viewing by remote access (using PicoLog) use our Ethernet Utility, as follows:

Setup utility

Before connecting to the units Ethernet port, you must first configure the Ethernet settings. Proceed as follows:

1. Connect the unit to your computer using the USB port.
2. Run the *Ethernet Settings* utility. There is a shortcut to this utility in the *Pico Technology* program group under the Windows *Start* menu.
3. Set the *Device Types* control to the name of your unit (e.g. "PT-104 (USB)").
4. The serial number of your device should appear in the device list. Click the device once to select it.
5. Set the *Enable Ethernet Settings* check box.
6. Enter the IP address and port that you wish to give the device. You may need to ask your network manager for an IP address that does not conflict with existing devices on the network.
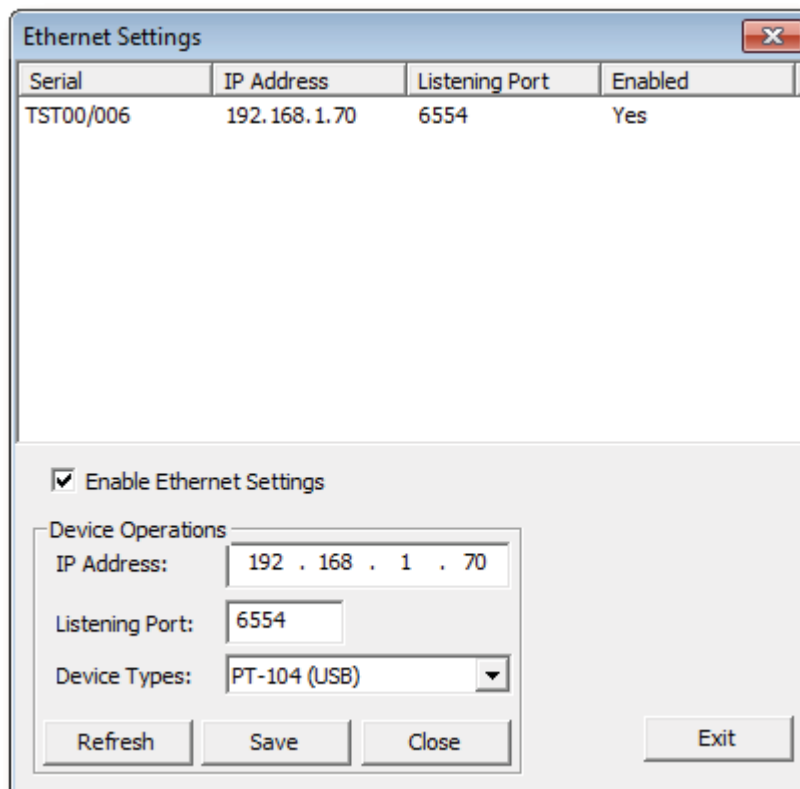
7. Click *Save.*
8. You can now either continue to use the unit as a USB device, or unplug the USB cable and reconnect the device using its Ethernet port.

Power-saving tip

If you wish to stop using the unit in Ethernet mode, you can use the *Ethernet Settings* utility to disable its Ethernet port. This reduces the power consumption of the device when used in USB mode.

Ethernet and USB

Do not use the unit in USB mode when it is being powered by Power-over-Ethernet (PoE). This could cause the unit to radiate electromagnetic energy outside the limits permitted by FCC and EU regulations, and could also cause it to produce spurious measurements. It will not, however, cause permanent damage to the unit.

LAN connection

To use the unit on a local-area network (LAN), connect it to your network switch or network router using the Ethernet cable provided.

Direct connection

You can also connect the unit directly to the network port on your computer. For this connection, you will need to use an Ethernet crossover cable (not supplied).

Power over Ethernet (PoE)

The unit can obtain its power from the Ethernet port as a Powered Device (PD) according to the PoE standard. To use this feature, you must connect the unit to Power Sourcing Equipment (PSE) such as a network switch, router or power injector that also supports the PoE standard. Any standard Ethernet cable up to 100 m (about 328 ft) in length can be used.

3.12   Transfer data over an IP network

The PicoLog IP socket facility is used to take measurements on one or more computers, and record the data on another computer.

The measurements are taken by PicoLog on the Server. Another computer, the Client, requests the data via an IP network.

On the server:

1.   Click **Start**
2.   Right-click **(My) Computer**
3.   Click **Properties**
4.   Windows XP: Click **Computer Name** and note the name listed after "Full computer name"
5.   Windows Vista/7: Note the name listed after "Computer name"

On the client:

1.   Open a command box (click **Start** button, click **Run...**, type `cmd`)
2.   Type `ping` followed by the server name
3.   The computer will display the time taken to send a message to the server and receive a response
4.   Check that it is working and note the time

On the server:

1.   Start PicoLog
2.   From the **File** menu, select **Preferences**
3.   Select **IP Sockets**
4.   Check the **Enable Server** box
5.   Click **OK**
6.   Set up PicoLog to measure the channels that you require

On the client:

1.   Start PicoLog
2.   From the **File** menu, select **Preferences**
3.   Select **IP Sockets**
4.   Check the **Enable Client** box
5.   Exit and restart PicoLog
6.   Select **New Settings**
7.   Enter recording details and click **OK**
8.   Enter the sampling details and click **OK**
9.   Select **Socket** in the **Converter type** box
10.   Click **OK**
11.   Type the server name, e.g. `server1`
       Note: Server names are case sensitive! `Server1` is not the same as `server1`.
12.   Click **Connect**
13.   The computer should now display the channels from the server
14.   Click one of the channels
15.   If you want to change the name, type the local name
16.   Click **OK**
17.   The channel you selected is marked with an X
18.   Repeat for each of the channels
19.   Click **OK**
20.   The monitor window should now display the readings from the server

3.13   Run multiple recorders

There are two limitations to using the multiple converters mode in PicoLog:

🔵 Data is collected at the same rate for each device
🔵 A single trigger will start the recording for all converters

If you need to overcome these limitations, two separate instances of PicoLog Recorder can be loaded. If you have tried this previously, you will have noticed that simply attempting to load PicoLog Recorder from the Start menu twice will load PicoLog Player.

You will need to create settings files for the configuration of each converter or each set of converters (use multiple converters mode):

1. Attach one (or the first set) of the converters to the PC
2. Start PicoLog, select New Settings from the File menu, then follow the sequence of dialogs to setup your Converter(s)
3. Select Save as... from the File menu, and from the drop down box, select .pls (settings file), then save
4. Disconnect the first converter and attach the second (or the second set) , then repeat the steps above.

Once you have a settings file for each converter or set of converters, you will need to start PicoLog Recorder from the command line.

1. From the Windows **Start** menu, select **Run...**
2. Type `"C:\Program Files\Pico Technology\Pico Full\plw32.exe" "C:\Program Files\Pico Technology\Pico Full\mysettings1.pls"` (where `C:\Program Files\Pico Technology\Pico Full\` is your installation directory, and `mysettings1.pls` is your first settings file)
3. Repeat the steps above for each of your settings files (e.g. `mysettings2.pls`)

Note: None of the converters should be running in <u>fast block mode</u> 2 or <u>streaming mode</u> 2 (this will take precedence, and inhibit other converters from recording during this period).

4   Menu bar

4.1   File

New settings
New data

Open

Save as...
Delete File

Preferences   ▶

Exit
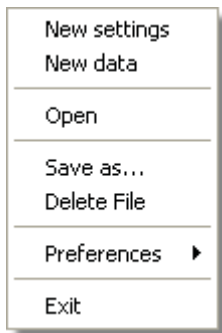
To access this menu, select **File** from the menu bar of PicoLog Recorder 6 .

New settings. Erases the current settings and then takes you, step by step, through the process of setting up PicoLog to collect some data. This process begins with the Recording Dialog 24 .

New data. Enables you to open a new file to record your data. If you save the file as a setup file, only the settings are stored. If you save it as a data file, both the settings and data are stored. You can also save the file as a text file only.

Open. Closes all active windows and then opens a data or setup file.

If you open a data file, the settings and data are copied from the file, and the data is displayed. If you open a setup file, only the settings are recovered, and no data is displayed until you start PicoLog running.

Save as... Asks for a filename and then writes the data to that file. If you save the file as a setup file, only the settings are stored. If you save it as a data file, both the settings and data are stored. You can also save the file as a text file only.

Delete File. Enables you to delete a file. Select the file and then click OK to delete it.

Preferences. This group of menu options enables you to customise PicoLog for Windows:

Colours
Sound
Temperature
IP Sockets
Converter
Recorder

Colours 43 - enables you to select the colours that PicoLog will use.

Sound 43 - enables you to select the sounds for certain events.

Temperature 44 - enables you to select the units for temperature measurements.

IP Sockets 31 - activates the IP network facility, allowing you to transfer data between two computers running PicoLog.

Converter 30 - used to specify what converter is to be used.

Recorder 44 - used to specify whether the **Re-record** and **Pause** buttons are displayed in the Recorder window.

Exit. Exits from the program.

4.2   Settings

To access this menu, from the menu bar of PicoLog Recorder, select **Settings**.

```
Recording
Sampling...
Input channels...
Calculated parameters

Monitor
```
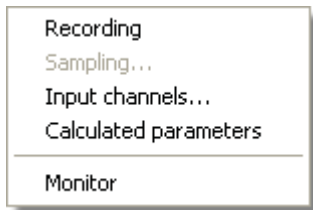
The settings menu appears on the menu bar at the top of the monitor window in PLW Recorder 6.

Recording 24. Enables you to choose the recording method for your measurements.

Sampling... 25 Enables you to specify the sampling rate and the action at the end of a run.

Input channels... 29 Enables you to specify the converter and port that will take the measurements.

Calculated parameters 38. Enables you to enter details for measurements which are calculated from one or more other measurements. This can be done either during data collection or after the data has been collected.

Monitor 37. Enables you to select the measurements that you wish to display in the monitor window. To select a measurement, highlight it and then click **OK**.

4.3   View

To access this menu, select **View** from the menu bar of PicoLog Recorder 6 or Player 7.

```
Player        Alt+P

Notes         Alt+N
Spreadsheet   Alt+S
Graph         Alt+G
XY Graph      Alt+X
```
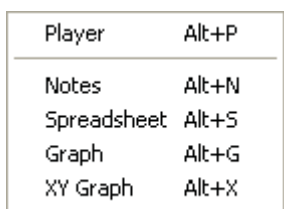
Player. Creates a new **Player** 7 window.

Notes. Creates a new **Notes** 12 window.

Spreadsheet. Creates a new **Spreadsheet** 11 window.

Graph. Creates a new **Graph** 8 window.

XY Graph. Creates a new **XY Graph** 10 window.

4.4   Help

To access this menu, select **Help** from the menu bar of PicoLog Recorder 6.

Index. Takes you to the index of the PicoLog help file.

Contents. Takes you to the contents page of the PicoLog help file.

This view. Explains the operation of the monitor window in **PLW Recoder** 6.

Guided tour. Shows you the main features of the program. A converter need not be connected.

About... Gives the version and serial number of this instance of Picolog.

4.5   Keyboard shortcuts

You can control some of PicoLog's functions using the following keys on the keyboard:

Key	Function
Alt-P	open Player View 7
Alt-N	open Notes View 12
Alt-S	open Spreadsheet View 11
Alt-G	open Graph View 8
Alt-X	open XY Graph View 10
F1	view Help 23 index

5   Dialogs

5.1   General dialogs

5.1.1   Recording

To access this dialog, open the **Settings** 22 menu of **PicoLog Recorder** and select **Recording**.
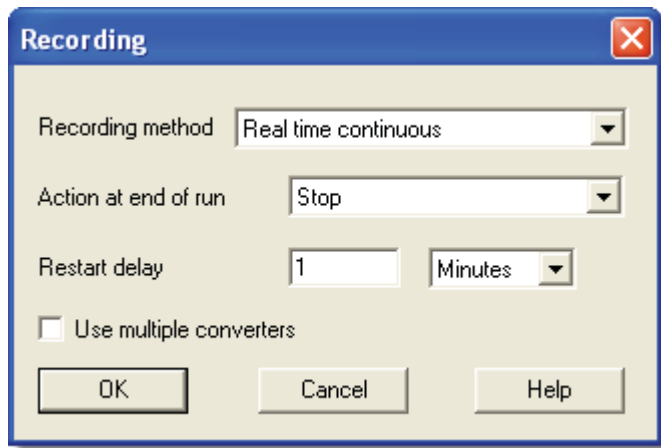
This dialog is used to specify which recording method will be used.

Note: this dialog is not displayed if you installed PicoLog for use with DrDAQ 114.

The options for **Recording method** are as follows:

- **Real time continuous.** In real time continuous mode you can record the data at the same time as displaying it in graphical or spreadsheet form. The maximum sampling rate is one per millisecond. With this method, you can use multiple converters.
- **Streaming.** In streaming mode you can record the data at the same time as displaying it in graphical or spreadsheet form. The sampling rate is controlled by the converter. This method is limited to a single converter.
- **Fast block.** In fast block mode, data is collected at high speed but cannot be displayed until after it is collected. The sampling rate is controlled by the converter. This method is limited to a single converter.

Use multiple converters. Check this box if you wish to use more than one converter. This option is not available for fast block or streaming recording.

Action at end of run. This defines what happens when all the samples have been collected. Choose one of the following options:

- **Stop.** Means stop collecting
- **Repeat immediately.** Means start a new run immediately after completing the current run
- **Repeat after delay.** Means start a new run after the restart delay has elapsed. This could be used to collect a one-minute block of data once per hour
- **Scroll.** Means that new samples will be recorded and the oldest samples will discarded. This is useful if you only wish to have a record of the most recent samples

When you select a repeat option, the program automatically increments a sequence number at the end of the filename.

Tip: if your filename ends with a date or time, as in `myTestJan01.plw`, the **Repeat** options will increment the final number, resulting in `myTestJan02.plw` and so on. To prevent this, add a suffix to the filename, as in `myTestJan01_1.plw`. PicoLog will then increment this to `myTestJan01_2.plw` and so on.

Restart delay. When in 'repeat after delay' mode, this is the time interval from the start of one run to the start of the next run.

5.1.2 Sampling Rate

To access this dialog, open the **Settings** 22 menu of **PicoLog Recorder** and select **Sampling...**
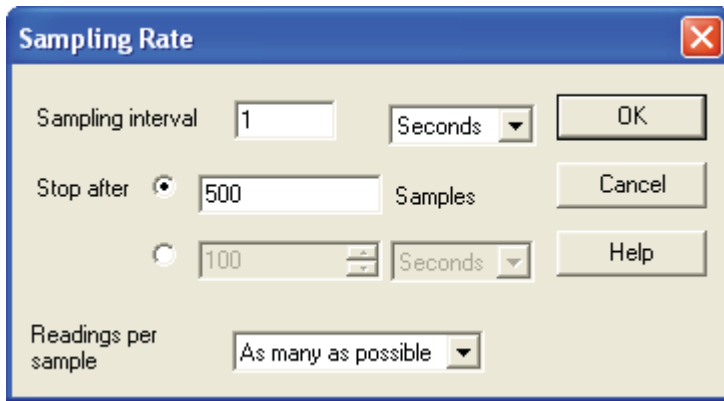
This dialog sets the sampling rate and defines the action to take at the end of a run.

Sampling interval. To set the interval between samples, type a number in the box and select the required units. The interval must be a whole number so, for example, 30 seconds must be specified rather than 0.5 minutes.

Note: When you have set sampling intervals of less than a second, displaying a graph whilst data recording is possible, but may interfere with recording.

Stop after. To set the maximum number of samples to be collected during a run, enter the number in the first box. The maximum can be up to a million samples. To set a time limit for a run, enter the time in the second box. During real-time data collection, the sampling can be stopped at any time, so you can enter a large number and then stop the run early.

Readings per sample. Normally PicoLog takes as many readings as possible during each sample period, then saves the average of the readings. If you need an instantaneous measurement, (for example, if you wish to calculate standard deviations), change this option to **Single**.

5.1.3   Print

To access this dialog click 🖳 when one of the display windows is open.
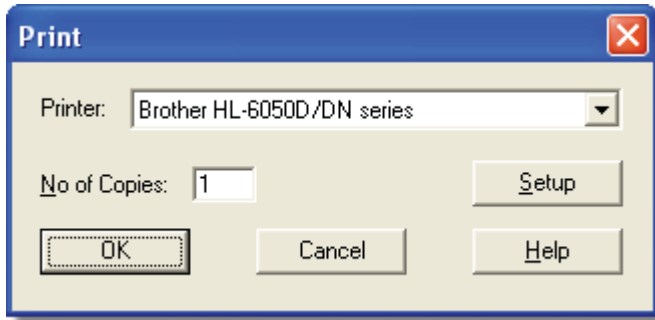
Printer. At the top is a box with the name of the default printer. You can select a different printer if you wish.

Setup. Use the **Setup** button to open a dialog with setup information specific to the selected printer.

Once all the details are correct, click **OK** to start printing.

5.1.4   Confirm File delete

If you want to delete a PicoLog file you have saved on your hard disk, open the **File** 21 menu of PicoLog Recorder and select **Delete File**. A window appears showing you the list of files in the active directory.

Double-click on the name of the file you want deleted. The following dialog appears.
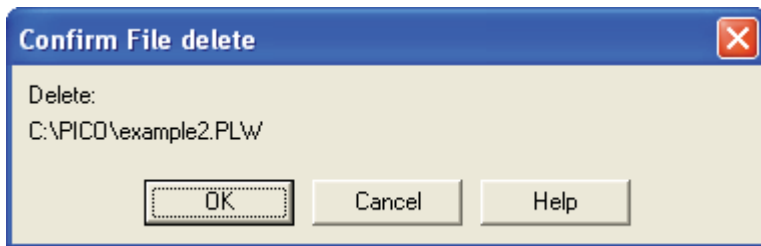
If you are certain that you want to go ahead with deletion, click the **OK** button.

5.1.5   Signal Conditioner

To access this dialog, click the **Conditioner** button in the **Parameter options** 34
dialog.
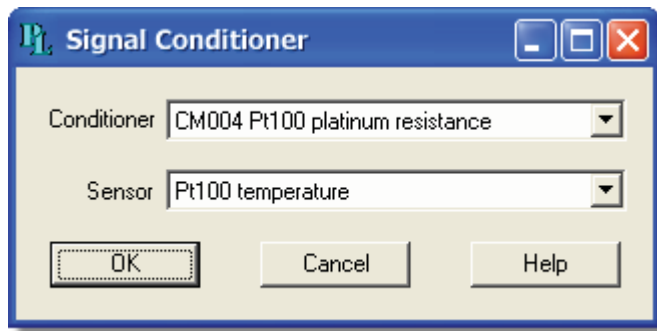
This dialog provides support for the Pico range of signal conditioners. A signal
conditioner provides excitation or power, or both, for a sensor and then amplifies the
output from the sensor.

When you use this dialog to specify a signal conditioner and sensor, the computer
automatically converts the input voltage into the appropriate units for this sensor.

Signal conditioner calculations are done before normal scaling, so it is possible to
make further adjustments to the scale using the **Parameter scaling** 35 dialog. This
can be used to do the following things:

- Make small corrections after calibrating a sensor
- Convert from metric to imperial units
- Convert from amps to kilowatts

Conditioner. This is where you select what type of signal conditioner you will be
using.

For the ADC-16, the computer automatically detects the signal conditioner type but for
other converters, it is necessary to manually select the signal conditioner.

Sensor. Once you have selected a conditioner, the sensor dialog contains a list of
sensors that are suitable for use with the specified conditioner. Select the sensor that
you wish to use.

Information about sensors is stored in a set of Pico Signal Conditioner (`.psc`) files.
You can also create your own `.psc` files to add other sensors.

5.1.6   Converter-related

5.1.6.1   Converter details

To access this dialog, select **Input channels...** from the **Settings** 22 menu.
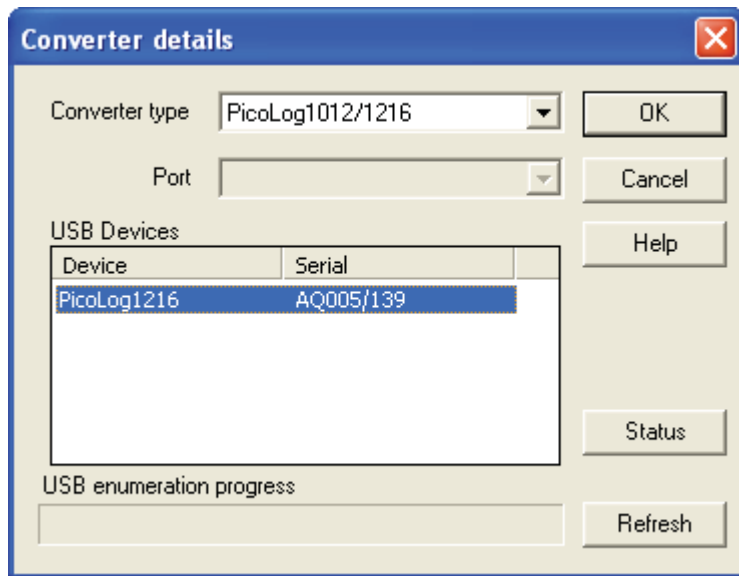
This dialog is used to specify the details for a converter. Note that it is NOT displayed if you set the **Converter preferences** 30 to automatically select a particular converter.

Converter type. This lists the types of converter that can be used with the program. Please note that not all the converters will be available if an incompatible mode has been selected from the **Recording** 24 dialog.

Port. This option is available if the attached converter uses one of the following connection methods:

- Parallel port
- Serial port
- USB-parallel port adapter (these are allocated in the order in which units are connected to the PC)

Select the port to which the converter is connected.

USB Devices. When a product that supports USB natively is selected from the **Converter type** list, the **Port** field will be greyed out and a list of USB devices of the selected type that are currently attached to the PC will be displayed.

When attempting to edit the settings of a currently opened unit, then the unit that you are editing will appear highlighted at the bottom of the list. If unhighlighted units appear at the top of this list, these represent other available devices of this type attached to the PC. You can freely switch between these available units, but the settings of the unit you are editing will not be saved.

Note: Enumerating USB devices can take some time, especially if a number of USB devices are attached to the PC. Picolog may appear to lock up during this period, but this is normal.

Ethernet Devices. If the converter type is set to an Ethernet device, the dialog will list all matching devices on the local network that are visible to the computer. If your converter is not on this list but you know its IP address and port number, then you can type these numbers into the boxes provided and PicoLog will find it.

Refresh. After you have selected a converter from the **Converter type** drop-down list, click this button to scan for new USB devices.

Status. This informs you of the status of any converters you have attached to your computer. To ensure that your hardware is setup correctly, see the section on hardware setup.

OK. When you click the **OK** button, the computer will open a measurement dialog for the selected converter. (If you are using a Picoscope 3000 Series oscilloscope, for example, the computer will open the **PicoScope3000 Measurements** 79 dialog). A double-click with the mouse on the desired USB device will also have the same effect.

5.1.6.2   Converters

This dialog appears when you are using multiple converters.

To access this dialog, click the **OK** button in the **Converter details** 28 dialog. Note: If the **Use multiple converters** box is ticked in the **Recording** 24 dialog, selecting **Input channels...** from the **Settings** 22 menu will take you directly to the **Converters** dialog.
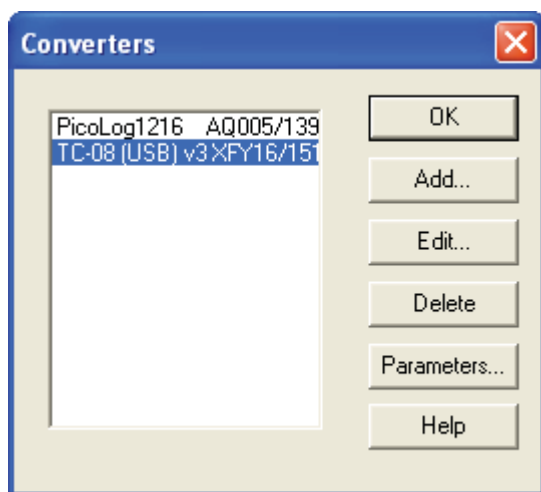
The dialog is used to build up a list of converters 11 to use. In the pane on the left will be a list of the converters that are currently active.

Add... To add another converter to the list, click **Add...** This will open the **Converter details** 28 dialog so you can enter the type and port for the new converter.

Edit... To edit the details for an existing converter, highlight the entry for it and click **Edit..**. This will open the **Converter details** dialog.

Delete. To remove a converter from the list, highlight the converter and click **Delete**.

Parameters... To specify the measurements to be measured for a converter, highlight the converter and click **Parameters...**

5.1.6.3   Converter preferences

To access this dialog, open the **Preferences** 21⤶ submenu in the **File** 21⤶ menu and
select **Converter**.
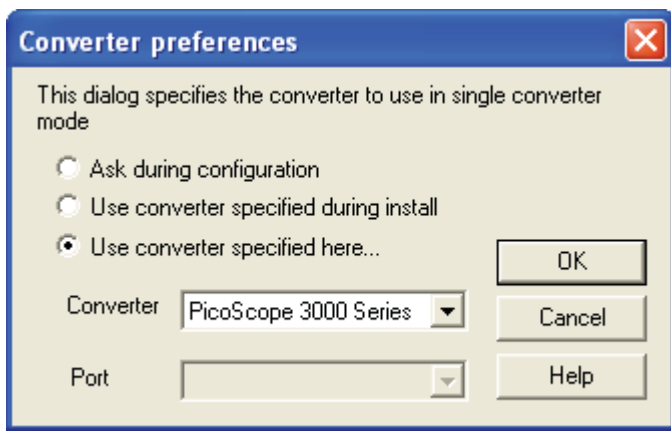
So that the computer does not ask each time you define new settings, you can specify
in advance which converter to use. The options available are as follows:

- **Ask during configuration.** Ask for the converter every time you enter new
  settings
- **Use converter specified during install.** Use the converter specified when
  PicoLog was installed
- **Use converter specified here...** Use the converter specified in this dialog

When you select the last option, the computer enables the converter and port fields on
the dialog.

5.1.7   IP socket-related

5.1.7.1   IP Socket options

To access this dialog, open the **Preferences** 21 submenu in the **File** 21 menu and
select **IP Sockets**.
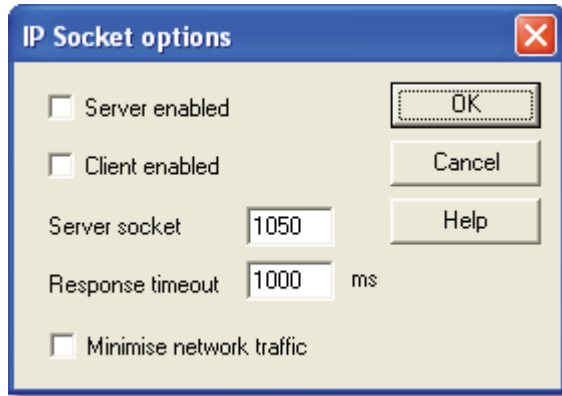
This dialog is used to specify the details required to establish a link between
computers via an IP network.

One computer is referred to as the server. This is the computer supplying data. The
other computer is referred to as the client. This is the computer receiving data. It
displays the measurements as if they are being collected locally. A server can support
any number of clients, and a client can get data from up to 10 servers.

Server enabled. When this option is selected, PicoLog will start responding to
requests for data from any PicoLog clients that contact it.

Client enabled. This sets this computer to act as a client. When it is checked, the
socket device appears in the **Select Device** dialog.

Server socket. This specifies what IP socket the server will use. It is not normally
necessary to change it, unless the socket is already in use by another application. If
you change it, you must do so on the server and on all clients.

Response timeout. This only has an effect on the client. It controls how long the
client will wait for a response from the server. You can use the `ping` command to find
out how long a round trip normally takes.

Minimise network traffic. If this box is not checked, the client will continuously
request data from the server. This is OK over a local network, but could cause a dial-
up bridge between two subnets to stay active all the time. If you check this box, the
client only asks for data once per sample period. With a sample period of an hour, the
client will only contact the server once per hour.

5.1.7.2   Socket channels

Accessed from the **Converter details** [28] dialog.

Note: Only accessible when **Client enabled** has been checked in the **IP Socket options** [31] dialog and the **Converter type** has been set to **Socket** in the **Converter details** [28] dialog.
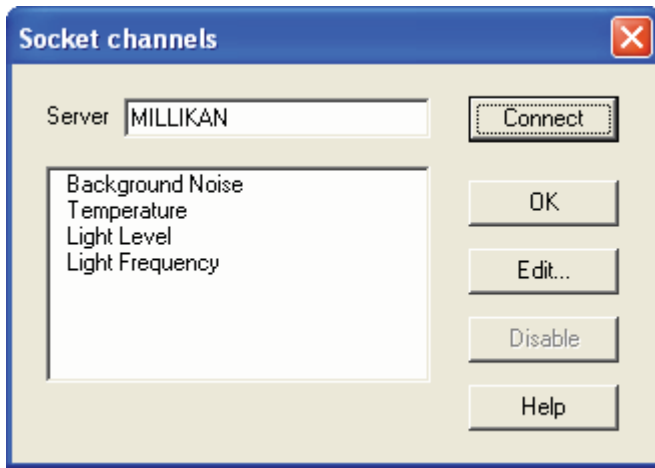
This dialog is used to establish a connection to another instance of PicoLog running on a remote server computer, and then to select the channels that are to be imported to this instance of PicoLog.

Server. This is the name of the server. If it is on your local network, the computer name should be enough (for example, "carnot"). If you want to communicate via a large network or the internet, you will need to put the full name of the computer, for example, "carnot.picotech.co.uk."

Connect. Having entered a server name, click **Connect** to establish a link to the server. If successful, a list of channels (corresponding to measurements) available on the server will appear. If someone changes the details on the server, you can click this button to update the details locally.

Edit... To edit a channel, first select it, then click this button. The **Edit socket channel** [33] dialog will appear so that you can enter the details.

Disable. To disable a previously selected channel, highlight it and click this button.

5.1.7.3   Edit socket channel

To access this dialog, click the **Edit...** button in the **Socket channels** 32 dialog.
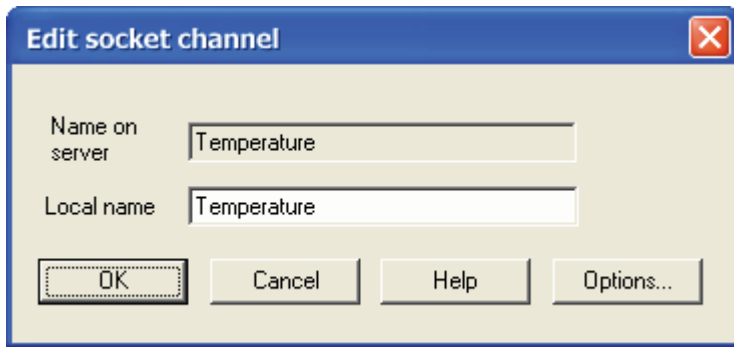
This dialog is used to enter the details for a channel.

Name on server. This is the name of the channel on the remote server computer. It cannot be changed from the local computer.

Local name. This is the name of the channel as it will appear locally.

Options... To set the **Parameter options** 34, click **Options...**

5.1.7.4   Device status

To access this dialog, click the **Status** button in the **Converter details** 28 dialog.
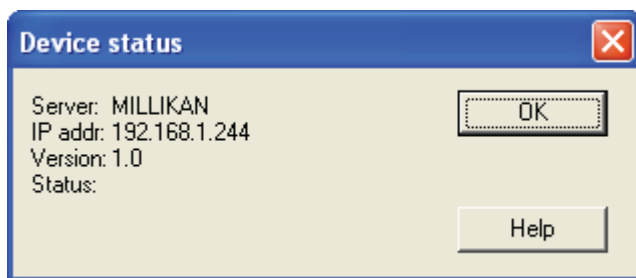
This dialog displays the details about the IP socket connection to the server.

5.1.8   Parameter-related

5.1.8.1   Parameter options

To access this dialog, click the **Options...** button in the **Measurement** dialog for the converter. If you are using an ADC-16, for example, the measurement dialog for the converter would be the **Edit ADC16 Channel** 53 dialog.
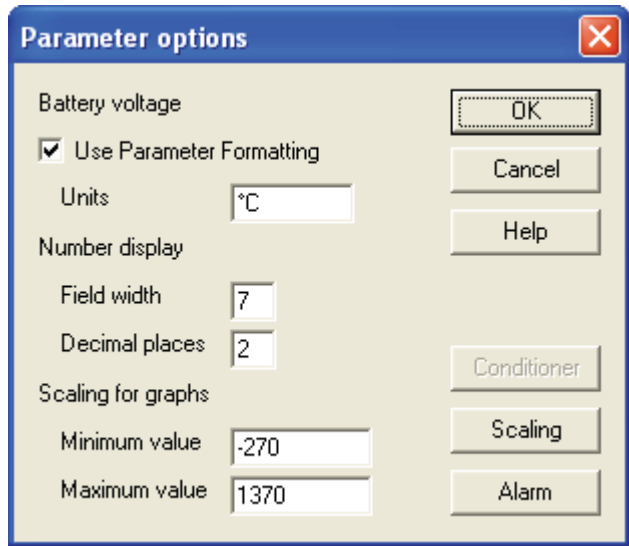
This dialog is used to set up measurement definitions.

Use Parameter Formatting. By default, the measurement or channel that has been setup will use its own default values for formatting. If you want to use your own scaling, click the **Scaling** button. We recommend that you tick the **Use Parameter Formatting** check-box and enter your own values in the fields described below.

Units. The units you enter here will appear on spreadsheets and graphs.

Number display. This defines the format of the information for spreadsheet entries and graph scales. For example, with a field width of 6 and 2 decimal places, a number will appear in the format ddd.dd. The field width must be between 1 and 8, and the number of decimal places must be less than the field width.

Scaling for graphs. This defines the maximum and minimum values to be used for graphical displays.

Note: Any scrolling in the **PLW Graph** 8 window is based on these numbers, and limited by them. Once you have saved your data, these cannot be changed, so ensure that these limits extend up to or beyond the maximum data values you expect to capture.

Conditioner. The **Conditioner** button is used when a signal conditioner is connected to a channel. It opens the **Signal Conditioner** 27 dialog, which enables you to select the type of conditioner and sensor that is connected to an ADC channel. Once selected, the computer scales the input into the appropriate units for the sensor.

Scaling. The **Scaling** button opens the **Parameter scaling** 35 dialog, which can be used for the following two purposes:

● Converting an input voltage into some other units
● Applying minor scaling corrections to values that have already been scaled for a particular signal conditioner and sensor

PicoLog is supplied with an extensive library of scaling information for sensors from a variety of manufacturers.

Alarm. The **Alarm** button opens the **Alarm settings** ⌐36⌐ dialog for this measurement definition.

5.1.8.2   Parameter scaling

To access this dialog, click the **Scaling** button in the **Parameter options** ⌐34⌐ dialog.
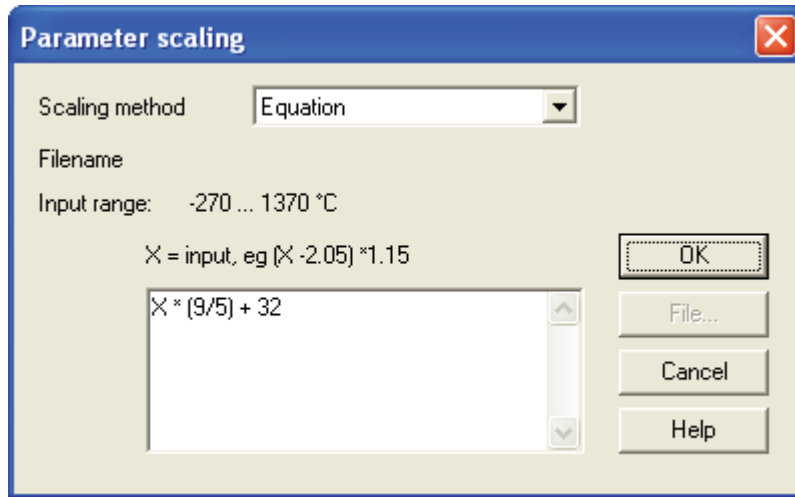
This dialog is used to specify how to convert a measurement value into some other unit, for example from volts to temperature. It is invoked when you click the **Scaling** button in the **Parameter options** ⌐34⌐ dialog.

Scaling Method. There are three scaling methods: **None**, **Table lookup**, and **Equation**. You can also read in a lookup table or an equation from a file.

Table lookup. This is useful for a set of input readings corresponding to different values of the measurement to be scaled. You can put two or more pairs of values in the box below. For example, to convert a 0 to 2.5 V input to −40 to 100 °C, enter the following details in the box:

```
0     -40
2.5   100
```

Two pairs are sufficient if there is a linear relationship between the raw and scaled values. For non-linear relationships, the required number of pairs depends on the maximum acceptable interpolation error. If you wish to enter more than half a dozen pairs of values, it is better to enter the table into a file, and then use file scaling (see below).

Equation. This can be used when it is possible to calculate the relationship between the input reading and the measurement value. The raw measurement values is represented by x. For example, to convert a temperature from Fahrenheit to Celsius, the equation would be:

```
(x-32)* 5 / 9
```

For more information on equations, see equation notation ⌐124⌐.

File. When you specify that you wish to use a file for scaling, this button is enabled. When you click this button, the computer opens up a dialog to select a scaling file.

Scaling from file

If you wish to scale the inputs from a number of identical measurements using the same method, or if you wish to set up a large lookup table. See Scale file format 121 for more information on the format.

5.1.8.3   Alarm settings

This dialog defines the alarm settings for each measurement. It is invoked when you click the **Alarm** button in the **Parameter options** 34 dialog. To access it, click the **Alarm** button in the **Parameter options** 34 dialog.
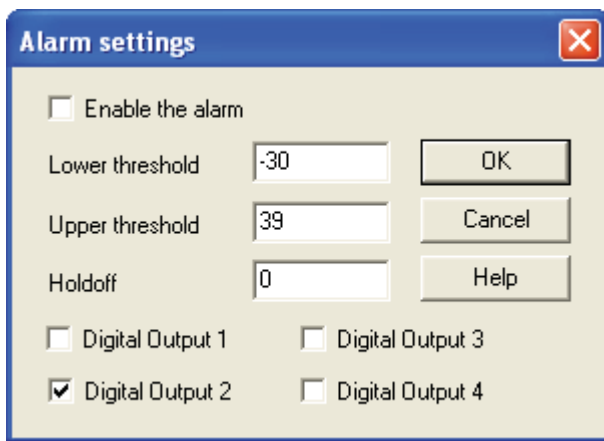
Enable the alarm. If you wish to enable alarm limits for this measurement, check this box.

Lower and upper thresholds. If the measurement goes out of this range, the alarm will sound.

Holdoff. If the measurement value occasionally goes out of range for short periods, you can prevent this causing an alarm by setting a holdoff period. The alarm will then sound only if the measurement stays out of range for longer than the holdoff period, measured in seconds.

Digital Output 1...4. If your data logger unit has digital outputs, you can make PicoLog drive one or more of them when an alarm condition occurs. Tick the boxes next to the outputs that you wish to activate. An output will be greyed out, and therefore unavailable, if it is currently in use as an input (as selected by the **ADC-24 Channels** 55 dialog).

Digital outputs can be used only in real-time recording mode 24.

The Digital Output tick boxes are displayed only if your data logger has digital outputs.

5.1.8.4   Select parameters

This dialog is used to select the parameters that will be displayed in a window.

From the monitor window in **PLW Recorder** 6, you access this dialog by selecting **Monitor** from the **Settings** menu. From the **PLW Graph** 8, **PLW XY Graph** 10, and **Spreadsheet** 11 windows, click ▤ (the **measurement selection** button).
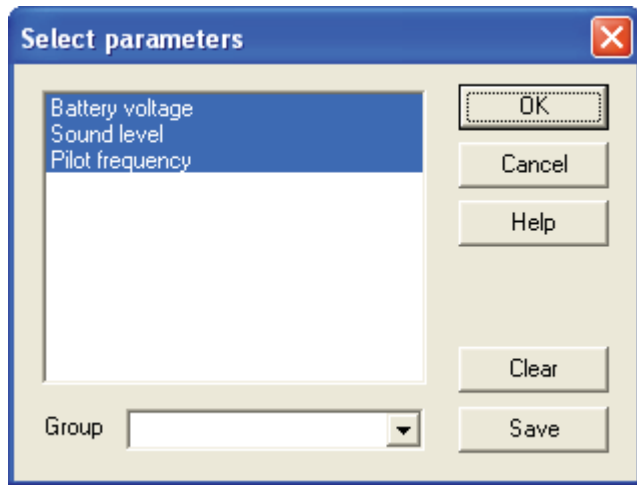
Parameter list. The selected parameters are highlighted. Click any parameter to select or deselect it.

Group. At the bottom is the **Group** list box. You can use this to save and restore a number of named groups of parameters.

To save the currently selected parameters as a group, type a new group name in the **Group** box and click **Save**.

To select a saved group, open the list box and click the required group. If you then click **OK**, the parameters from the selected group will be displayed in **PLW Recorder**.

To modify a saved group, make the changes to the parameter selection, type the group name and then click **Save**.

To delete a saved group, deselect all parameters, type the group name and then click **Save**.

5.1.8.5   Calculated parameters

To access this dialog, select **Calculated parameters** from the **Settings** 22 menu.
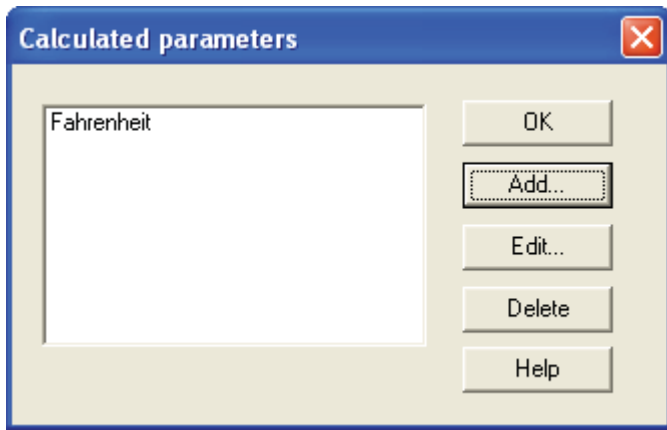
This dialog is used to add or edit calculated parameters. Calculated parameters are readings that need some action performed on them before they can be presented as measurements. For instance, thermocouple voltage readings cannot be turned into temperature measurements without the aid of a scaling table.

Unlike raw measurements, with calculated measurements, it is possible to change their details once a run is completed.

On the left is a list of calculated measurements and on the right are some buttons which enable you to add, edit or delete calculated measurements.

Add. To add a new calculated measurement, click the **Add...** button. This will open the **Edit calculated parameter** 39 dialog.

Edit. To edit the details for a calculated measurement, first highlight it and then click the **Edit...** button. This will open the **Edit calculated parameter** 39 dialog so that you can enter the details.

Delete. To remove a calculated measurement, first highlight it, then click the **Delete** button.

5.1.8.6   Edit calculated parameter

To access this dialog, click on the **Add...** or **Edit...** button in the **Calculated parameters** 38 dialog.
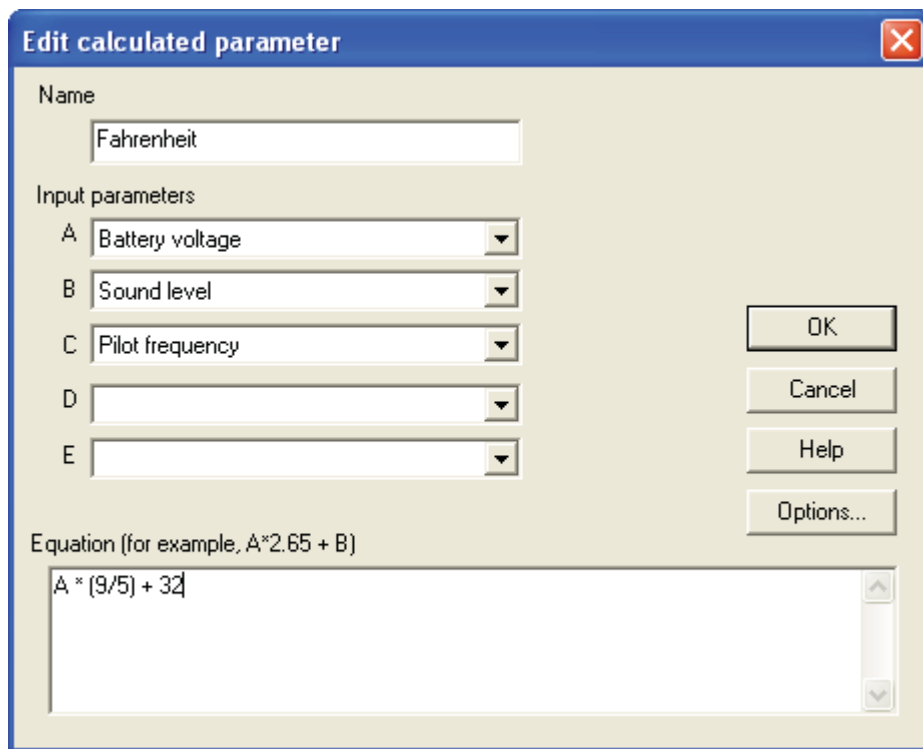
This dialog enables you to edit the details for a calculated measurement. A calculated measurement is calculated from up to five other measurements, using an equation.

Fields A to E. These fields enable you to select up to five measurements (raw or calculated) which are to be used in a calculated measurement. If you require less than five input measurements, unused measurements should be left blank.

Equation. Here you enter the equation that explains how to calculate this measurement from the input measurements. The input measurements are represented by A,B,C,D and E. For example, to calculate the power output from a boiler, the input measurements might be:

    A = inlet temperature
    B = outlet temperature
    C = flow rate

and the equation would be:

    (A-B) * C * 4120

See the Equation Notation 124 topic for more information.

Options. Set the options (units, range etc) for this measurement from Parameter options 34.

5.1.9   Window-related

5.1.9.1   Graph options

To access this dialog, click ☑ in the **PLW Graph** ⌐8¬ window.

This dialog is used to set the options for the **Graph** window.

Title. This is the title of the graph that will appear on the graphical reports.
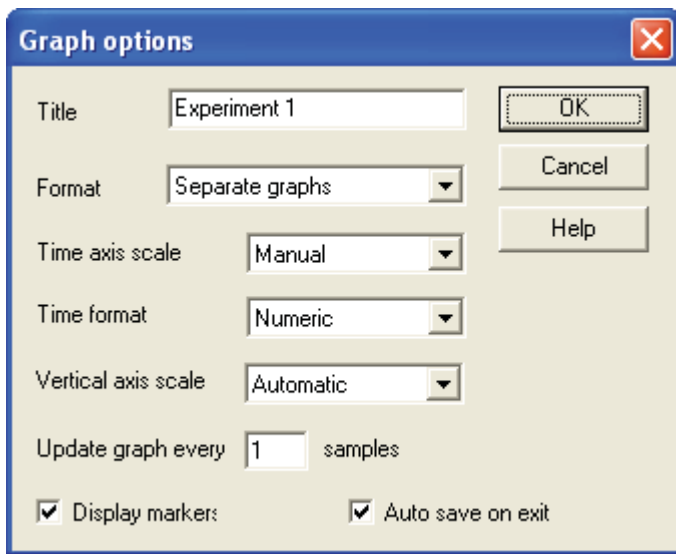
Format. This specifies how traces are to be divided between graphs. The choices are:

- Automatic - the traces are allocated by the computer, putting traces with the same units on the same graph.
- Separate graphs - each measurement is displayed on a separate graph.
- All traces on same graph - each measurement is displayed on the same graph

Time axis scale. This allows you to choose how the time axis is scaled:

- Automatic - the scaling is set by the computer.
- Maximum - the time axis is set to the maximum sampling time
- Scroll - the display is scrolled across the screen
- Manual - the scale can be changed by clicking on the scroll left/right tool buttons on the **Graph** window.

The time axis scale is automatically set to **Manual** if you click any of the time scrolling buttons.

Time Format. This allows you to choose the format for the time axis:

- Numeric - the time in the selected sampling time units since the start of the run
- Time since start - the time in hours and minutes since the start of the run
- Time of day - the real time
- Date/time - the real time including the date

Vertical axis scale. This allows you to choose how the vertical axis is scaled:

- Automatic - the scaling is set by the computer.
- Maximum - the axis is set to the maximum
- Manual - the scale can be changed by clicking on the vertical scrolling buttons on the Graph window.

The **Vertical axis scale** is automatically set to **Manual** if you click any of the vertical scrolling buttons.

Display every xxx samples. If you are displaying a graph while collecting data, this controls how frequently the graph is updated. It has no effect after you have finished recording, or when using the player.

When collecting fewer than a thousand samples, leave it set to 1. When collecting a large number of points, it may take some time to update the graph, so updating every time a new reading is taken would be a waste off effort.

Display Markers. When this box is checked and there is more than one trace on the graph, the computer displays markers (triangles, circles etc) on the traces to help identify the traces.

Auto save on exit. When this box is checked, all graph window settings are saved automatically when you close the graph window.

5.1.9.2   XY options

To access this dialog, click [✓] in the **PLW XY Graph** [10] window.
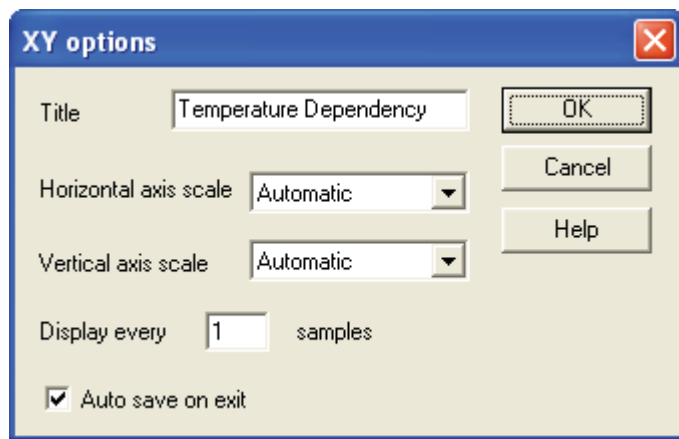
Title. This is the title of the graph that will appear on graphical reports.

Horizontal/Vertical axis scale. This allows you to choose how the axes are scaled:

- Automatic - the scaling is set by the computer.
- Maximum - the axis is set to the maximum
- Manual - the scale can be changed by clicking on the scroll buttons on the **XY Graph** window.

The axis scale is automatically set to **Manual** if you click any of the scroll buttons.

Auto save on exit. When this box is checked, all XY graph window settings are saved automatically when you close the **XY Graph** window.

5.1.9.3   Spreadsheet options

To access this dialog, click ☑ in the **Spreadsheet** window.

Auto save on exit. When this box is checked, all event window settings are saved automatically when you close the event window.
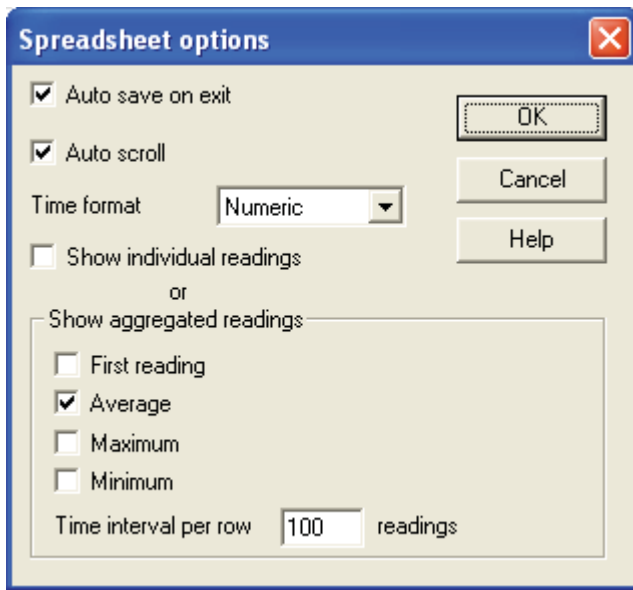
Auto scroll. When auto scroll is enabled whilst sampling is in progress, the windowed range is updated automatically to keep the latest reading visible.

Time Format. This allows you to choose the format for the time:

🔵 Numeric - the time in the selected sampling time units since the start of the run
🔵 Time since start - the time in hours, minutes and seconds since the start of the run
🔵 Time of day - each sample is labelled with the time it was taken
🔵 Date/time - each sample is labelled with the date and time it was taken

Show individual/aggregated readings. When **Show individual readings** is checked, the spreadsheet window shows each individual reading.

When the box is cleared, the computer displays results which are aggregates (1st reading/average/maximum/minimum) of the readings for the time interval specified below. The controls in the **Show aggregated readings** box are then enabled. If you select more than one control, the computer displays the corresponding number of columns for each sensor in the spreadsheet, and adds a heading (1st reading/average/ maximum/minimum) to each column.

Time interval per row. This specifies the time interval between each of the rows on the spreadsheet. If, for example, the sampling interval was set for every minute, and you set the time interval per row to 60, each row will be the (1st reading / average / maximum / minimum) of 60 readings.

5.1.10   Preferences

5.1.10.1   Colours

To access this dialog, select **Colours** from the **Preferences** 21 submenu in the **File** menu.
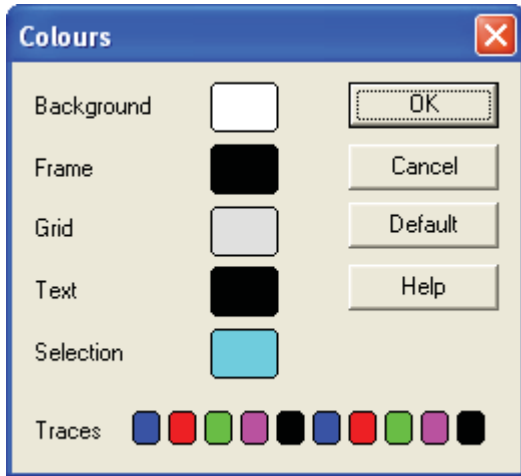
This is used to specify the colours for the background, text and traces for the graph and spreadsheet windows. To change a colour, click on the colour button to open the colour selection dialog.

Background. This is the colour for the background on graphs, and for non-selected readings on the spreadsheet.

Frame. This is the colour of the frame around graphs.

Grid. This is the colour for the grid on the graphs.

Text. This is the colour for text.

Selection. This is the colour for the selected readings on the spreadsheet.

Traces. A graph can display up to ten traces: the ten buttons along the bottom of the dialog are the colours for each trace.

5.1.10.2   Sounds

To access this dialog, select **Sound** from the **Preferences** 21 submenu in the **File** menu.
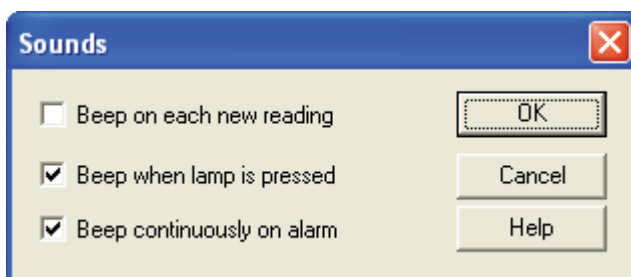
For some events, PicoLog can make a sound when an event occurs. This dialog allows you to enable the sounds for each type of event.

Beep on each new reading. This option is useful if there is a problem and you need to keep a close check on it. If you select a graph or spreadsheet window, the computer beeps each time a new reading is added to the graph or spreadsheet.

Beep when lamp is clicked. When there is an alarm set, the lamp on the monitor window turns red. You can click on the lamp to cancel the alarm. When this box is checked, the computer beeps to confirm it has accepted your request to cancel the alarm.

Beep continuously on alarm. When this box is checked, the computer produces a continuous tone while an alarm is active.

5.1.10.3   Temperatures

To access this dialog, select **Temperature** from the **Preferences** 21 submenu in the **File** menu.
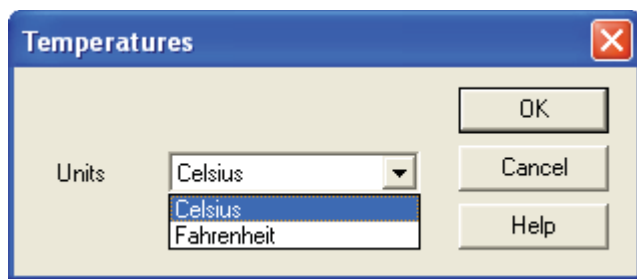
This is used to specify the units for temperature measurements. The options are Fahrenheit or Celsius (Centigrade).

5.1.10.4   Recorder preferences

To access this dialog, select **Recorder** from the **Preferences** 21 submenu in the **File** menu.
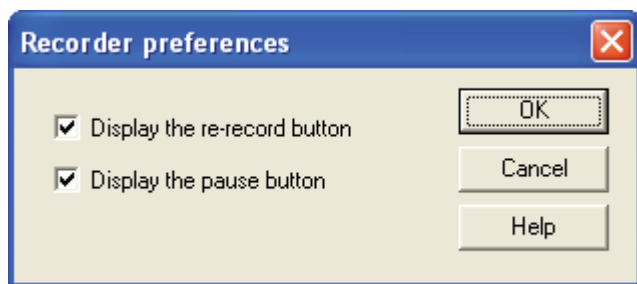
Some buttons can be disabled to prevent the accidental erasure of data.

Display the re-record button. Chooses whether 🔁 is visible in the **PLW Recorder** 6 window.

Display the pause button. Chooses whether ❚❚ is visible in the **PLW Recorder** 6 window.

5.2 Hardware configuration

5.2.1 ADC-10/12/40/42

5.2.1.1 ADC-10/12/40/42 Measurements

To access this dialog, assuming you have already set up PicoLog with an ADC-10, ADC-12, ADC-40 or ADC-42 as your converter, select **Input channels...** from the **Settings** 22 menu. Note: This dialog is accessible only when **Recording method** has been set to **Real time continuous** in the **Recording** 24 dialog.
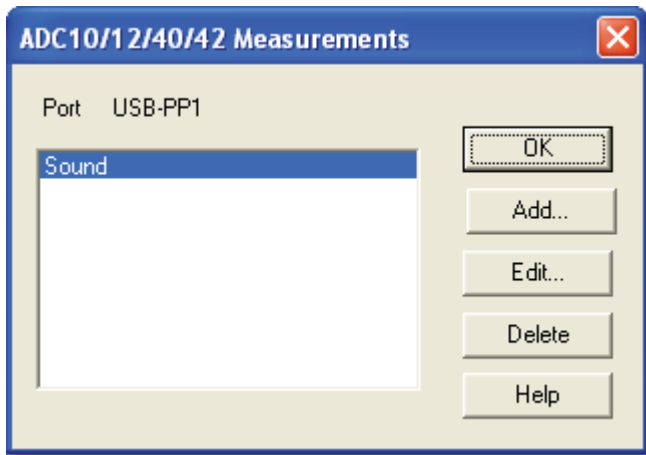
This dialog is used to build up a list of measurements to measure for a converter. On the left is the current list of measurements and on the right are buttons to update the list.

Add. To add a measurement to the list, click **Add**. This will open a dialog to enter details of the new measurement.

Edit. To edit a measurement in the list, highlight it and click **Edit**. This will open the **ADC10/12/40/42 Measurement** 45 dialog so that you can edit the details.

Delete. To delete a measurement in the list, highlight it and click **Delete**.

5.2.1.2 ADC-10/12/40/42 Measurement

Accessed via the **Edit** button in the **ADC10/12/40/42 Measurements** 45 dialog.
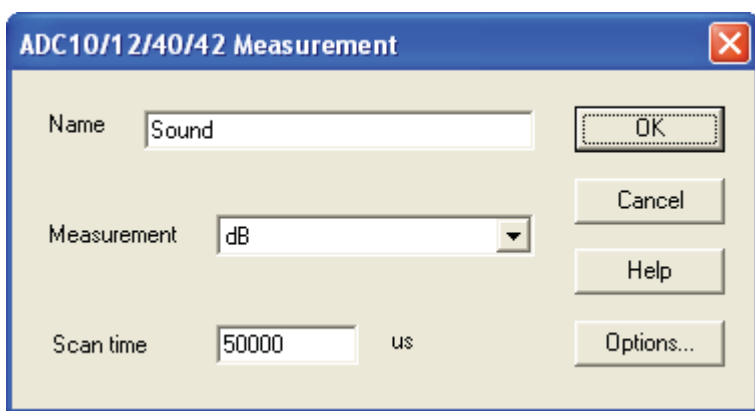
This dialog is used to enter the details for a measurement.

Name. This is the name of the measurement. It will appear on all reports.

Measurement. This specifies the type of measurement that will be made. The options are:

- DC volts - the DC component or average input voltage.
- AC volts - the RMS AC voltage (note that this excludes any DC component).
- dB - AC volts converted to decibels.
- Frequency - the frequency of the AC component, in hertz.

Scan time. This is the total time to take the set of readings for a sample. The scan time should be at least three cycles at the minimum frequency that you wish to measure.

Options. To set the options for the measurement (such as units and scaling) click **Options**. This will open the **Parameter options** ⃞34 dialog.

5.2.1.3   ADC-10/12/40/42 block

Accessed via the **OK** button in the **Converter details** ⃞28 dialog. Note: This dialog is accessible only when **Recording method** has been set to **Fast block** in the **Recording** ⃞24 dialog.
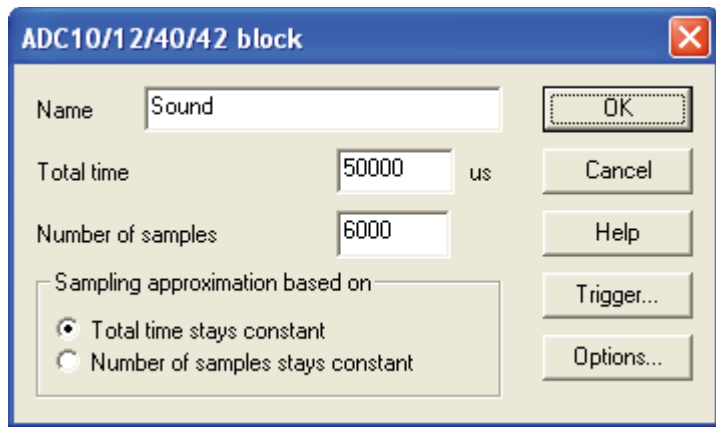
This dialog only applies to the block method of recording. It is used to select the total time and the number of samples that will be used to take measurements.

Name. This is the name of the measurement. It will appear on all reports.

Total time. This is the preferred time over which you want to collect the data.

Number of samples. This specifies the preferred number of samples to be taken during a block.

Sampling approximation. The ADC unit and the PC both have performance limits and will rarely be able to give exactly the settings that are requested. PicoLog will attempt to negotiate similar settings based on two user options:

- **Total time stays constant** - The time will remain very similar and the number of samples will be adjusted
- **Number of samples stays constant** - The number of samples will remain very similar and the time will be adjusted

When you click the **OK** button, the following dialog will appear to check whether the negotiated settings are acceptable (the dialog below does not represent the actual settings for this ADC):

(Results will vary on different PCs and in different situations)
Trigger. To enter the trigger details for the measurement click **Trigger**. This will open the **ADC10/12/40/42 Trigger** 47 dialog.

Options. To set the options for the measurement (such as units and scaling) click **Options**. This will open the **Parameter options** 34 dialog.

5.2.1.4   ADC-10/12/40/42 Trigger

Accessed via the **Trigger...** button in the **ADC10/12/40/42 block** 46 dialog.

Triggering is used to select the moment at which PicoLog collects data - usually at some fixed time before or after a trigger event.

A trigger event occurs when a specified channel crosses a voltage threshold - either rising or falling. PicoLog can start collecting data immediately after the trigger event, or a fixed time interval before or after the trigger event.

Trigger enable. If you wish to collect data only when the specified trigger conditions occur, check this box. If the box is not checked, data is displayed continuously.

Direction. The trigger direction can be either rising or falling. If rising is selected, the trigger event occurs when the voltage rises across the trigger threshold.

Channel. This selects which channel is to be used as the trigger input.

Threshold. This shows the voltage (in mV) that the trigger channel must cross in order for a trigger event to occur.

Delay. This controls the time delay, as a percentage of the sweep time, between the trigger event and the start of collecting data. A negative delay means that the computer will show data that was recorded before the trigger event - for example, -50% places the trigger event in the middle of the collected data and -100% means that all data is collected before the trigger.

Auto trigger. If you wish PicoLog to trigger after a specified time - even if no trigger event occurs - check this box. This will prevent PicoLog from waiting indefinitely for the event and locking up the computer.

Note: If you disable auto-trigger and the computer does lock up, you can press the F9 key to simulate a trigger.

Auto trigger after. The time after which PicoLog will trigger, even if no trigger event occurs.

5.2.1.5   Device status

Accessed via the **Status** button in the **Converter details** 28 dialog.
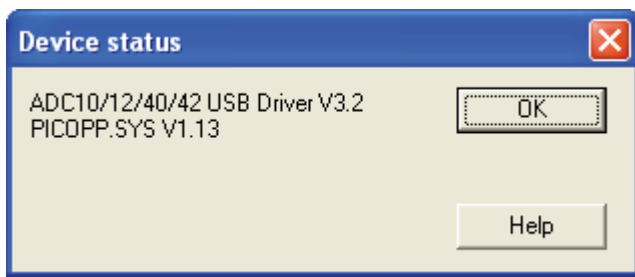
This dialog displays the details about the ADC status.

5.2.2 ADC-11/22

5.2.2.1 ADC-11/22 measurements

To access this dialog, assuming you have already set up PicoLog with an ADC-11 or ADC-22 as your converter, select **Input channels...** from the **Settings** ⌐22⌐ menu. Note: This dialog is accessible only when **Recording method** has been set to **Real time continuous** in the **Recording** ⌐24⌐ dialog.

This dialog is used to build up a list of measurements to measure for a converter. On the left is the current list of measurements and on the right are buttons to update the list.

Add. To add a measurement to the list, click the **Add** button. This will open a dialog to enter details of the new measurement.

Edit. To edit a measurement in the list, highlight it and click **Edit**. This will open the **Edit ADC11/22 Measurement** ⌐49⌐ dialog so that you can edit the details.

Delete. To delete a measurement in the list, highlight it and click **Delete**.

5.2.2.2 Edit ADC-11/22 Measurement

Accessed via the **Edit** button in the **ADC11/22 measurements** ⌐49⌐ dialog.

This dialog is used to enter the details for a measurement.

Name. This is the name of the measurement. It will appear on all reports.

Channel. This is the channel to be used for the measurement.

Measurement. This specifies the type of measurement that will be made. The options are:

- DC volts - the DC component or average input voltage.
- AC volts - the RMS AC voltage (note that this excludes any DC component).
- dB - AC volts converted to decibels.
- Frequency - the frequency of the AC component, in hertz.

Scan time. This is the total time to take the set of readings for a sample. The scan time should be at least three cycles at the minimum frequency that you wish to measure.

Options. To set the options for the measurement (such as units and scaling) click **Options**. This will open the **Parameter options** 34 dialog.

5.2.2.3   ADC-11/22 block

Accessed via the **OK** button in the **Converter details** 28 dialog. Note: This dialog is accessible only when **Recording method** has been set to **Fast block** in the **Recording** 24 dialog.

This dialog is used to select the channels and sampling rate for fast recording.

Edit. To select a channel, highlight it and click **Edit**. This will open the **Edit Channel** dialog so that you can enter the details.

Number of samples. This specifies the preferred number of samples to be taken during a block.

Total time. This is the preferred time over which you want to collect the specified number of samples.

Sampling approximation. The ADC unit and the PC both have performance limits and will rarely be able to give exactly the settings that are requested. PicoLog will attempt to negotiate similar settings based on two user options:

- **Total time stays constant** - The time will remain very similar and the number of samples will be adjusted

🔵 **Number of samples stays constant** - The number of samples will remain very similar and the time will be adjusted

When you click the **OK** button, the following dialog will appear to check whether the negotiated settings are acceptable (the dialog below does not represent the actual settings for this ADC):

Disable. To disable a measurement in the list, highlight it and click **Disable**.

Trigger. To enter the trigger details for a measurement, highlight it and click **Trigger**. This will open the **ADC11/22 Trigger** 51 dialog.

5.2.2.4   ADC-11/22 Trigger

Accessed via the **Trigger** button in the **ADC11/22 block** 50 dialog.

Triggering is used to select the moment at which PicoLog starts collects data - usually at some fixed time before or after a trigger event.

A trigger event occurs when the specified channel crosses a voltage threshold - either rising or falling. PicoLog can start collecting data immediately after the trigger event, or a fixed time interval before or after the trigger event.

Trigger enable. If you wish to collect data only when the specified trigger conditions occur, check this box. If the box is not checked, data is displayed continuously.

Direction. The trigger direction can be either rising or falling. If rising is selected, the trigger event occurs when the voltage rises across the trigger threshold.

Channel. This selects which channel is to be used as the trigger input.

Threshold. This shows the voltage (in mV) that the trigger channel must cross in order for a trigger event to occur.

Delay. This controls the time delay, as a percentage of the sweep time, between the trigger event and the start of collecting data. A negative delay means that the computer will show data that was recorded before the trigger event - for example, -50% places the trigger event in the middle of the collected data and -100% means that all data is collected before the trigger.

Auto trigger. If you wish PicoLog to trigger after a specified time - even if no trigger event occurs - check this box. This will prevent PicoLog from waiting indefinitely for the event and locking up the computer.

Note: If you disable auto-trigger and the computer does lock up, you can press the F9 key to simulate a trigger.

Auto trigger after. The time after which PicoLog will trigger, even if no trigger event occurs.

5.2.2.5   Device status

Accessed via the **Status** button in the **Converter details** 28 dialog.
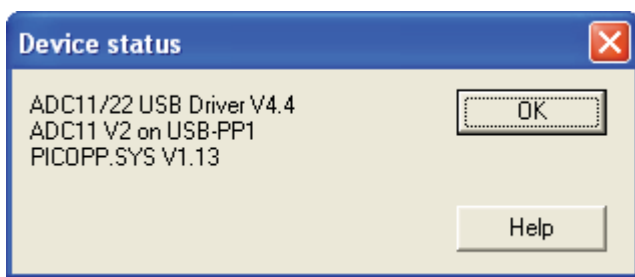
This dialog displays the details about the ADC connection to the server.

5.2.3   ADC-16

5.2.3.1   ADC-16 Channels

To access this dialog, assuming you have already set up PicoLog with an ADC-16 as your converter, select **Input channels...** from the **Settings** 22 menu.
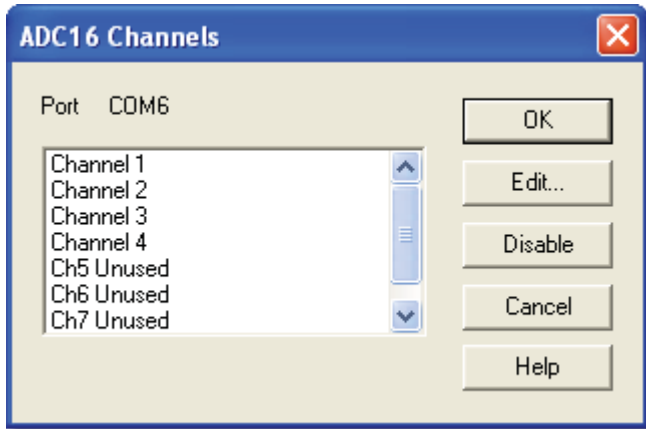
This dialog is used to select the channels that will be used to take measurements.

Note that, when using a CM001 signal conditioner adapter, only the first four channels are available. The remaining four channels are used for conditioner type detection.

Edit. To select a channel, highlight it and click **Edit**. This will open the **Edit ADC16 Channel** 53 dialog so that you can enter the details.

Disable. To disable a previously selected channel, highlight it and click **Disable**.

5.2.3.2   Edit ADC-16 Channel

Accessed via the **Edit** button in the **ADC16 Channels** 53 dialog.
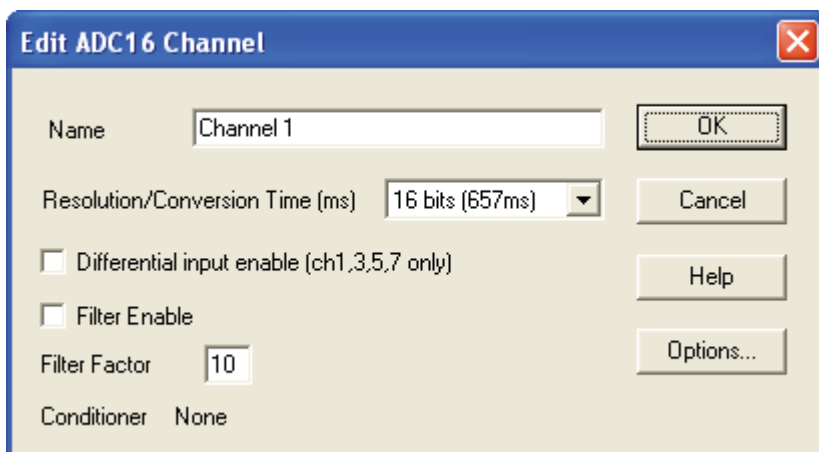
This dialog is used to enter the details for a channel.

Name. This is the name of the channel. This name will appear on all reports.

Resolution/conversion time. The resolution can be 13 to 16 bits. Values are signed so, for example, 16 bits will give values in the range - 65,535 to + 65,535.

The time taken for each measurement increases in proportion to the resolution: 16 bits gives the highest precision results but takes the longest time per reading.

Differential input. If you wish to measure the voltage difference between adjacent channels, check this box. This mode applies to channels 1, 3, 5, and 7. For example, if differential input is enabled for channel 1, the computer will measure the voltage difference between channel 1 and channel 2.

Filter enable. If you wish to use a filter to reduce the effects of electrical noise, check this box.

Filter factor. Each time a reading is taken, the filtered value is updated using the equation:

```
new value = old value + (reading - old value)/(filter factor)
```

Filtered values are more stable but the readings will respond relatively slowly to a step change in voltage. The higher the factor, the stronger the filtering effect will be.

Options. To set the options for a parameter 34, click **Options**.

Conditioner. If the ADC-16 driver detects that a signal conditioner module is fitted, this dialog will display the name of the signal conditioner. Use **Options | Conditioner** 27 to specify the type of sensor that you intend to connect to the signal conditioner.

5.2.3.3   Device status

Accessed via the **Status** button in the **Converter details** 28 dialog.
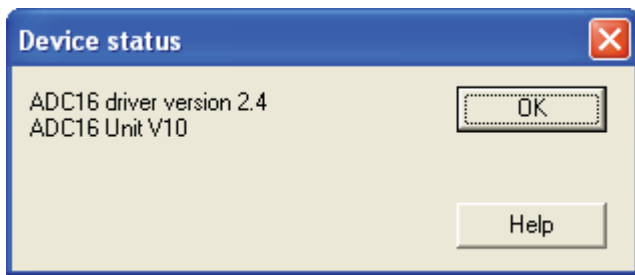
This dialog displays the details about the ADC status.

5.2.4   ADC-20/ADC-24

5.2.4.1   ADC-20/ADC-24 Channels

This dialog is used to select the channels that will be used to take measurements.   To access it, first set up PicoLog with a High-Resolution Data Logger as your converter, then select **Input channels...** from the **Settings** 22 menu.
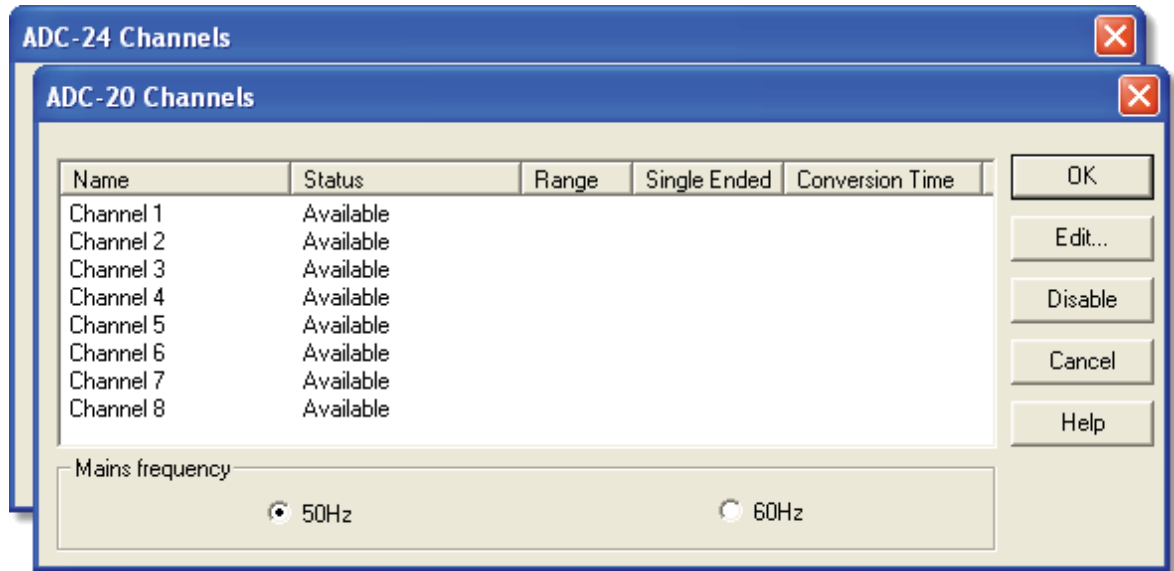
Status. If an even-numbered analog channel is being used in conjunction with its corresponding odd-numbered channel to form a differential input pair, its status will be shown as 'Unavailable'.

If your data logger unit has digital input channels, you will see them listed below the analog channels. If a digital channel is being used as an alarm 36 output, it will be unavailable for use as an input.

Edit. To select a channel, highlight it and click **Edit...** This will open the **Edit ADC-20 Channel** 56, **Edit ADC-24 Channel** 56 or **ADC-24 Digital Channels** 57 dialog so that you can enter the details.

Disable. To disable a previously selected channel, highlight it and click **Disable**.

Mains frequency. Click either the 50 Hz or 60 Hz radio button to indicate your local mains (grid) frequency. PicoLog uses this information to reduce mains noise on your signals.

5.2.4.2   Edit ADC-20/ADC-24 Channel

This dialog is used to enter the details for an analog channel.   To access it, highlight an available analog input channel in the **ADC-20 Channels** |55⌐ or **ADC-24 Channels** |55⌐ dialog and then click **Edit**.
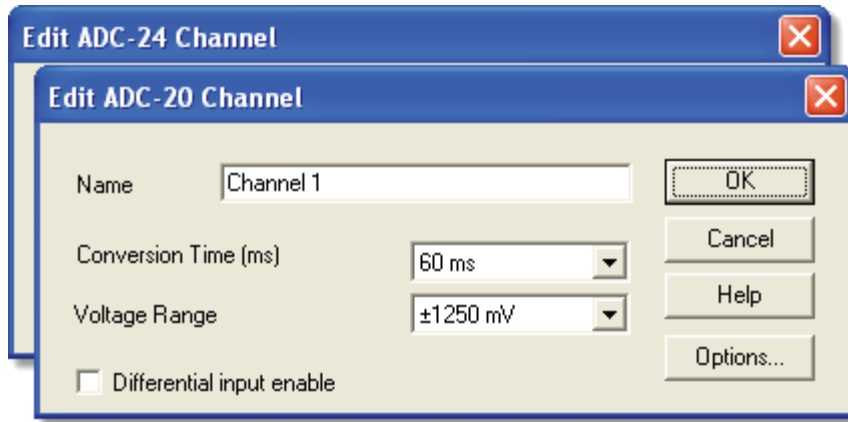
Name.   This is the name of the channel. You can enter any name here, and it will appear on all graphs and reports.

Conversion time (ms).   As well as setting the conversion time, this parameter also determines the noise-free resolution of the measurements. The User's Guide for your data logger unit contains a table showing the relationship between conversion time and noise-free resolution for the instrument.

Voltage range.   Your data logger has two or more voltage ranges. Select a voltage range that just covers the range of signals that you wish to measure. Try not to select too large a range, as this will reduce the accuracy of your measurements.

Differential input enable.   If you wish to measure the voltage difference between adjacent channels, tick this box. Only odd-numbered channels can be switched to differential mode. The adjacent even-numbered channel will be used as the negative input and will be marked as 'Unavailable' in the channel selection dialog. For example, if differential input is enabled for channel 1, the logger will measure the voltage difference between channel 1 and channel 2, and channel 2 will be marked as 'Unavailable'.

Options.   To set the options for a parameter |34⌐, click **Options**.

5.2.4.3   ADC-24 Digital Channels

This dialog is used to enter the details for an available digital input channel. A digital input is not available if it is being used as an alarm⎹ 36⎸ output. To access the dialog, highlight an available digital input in the **ADC-24 Channels**⎹ 55⎸ dialog and then click the **Edit...** button.
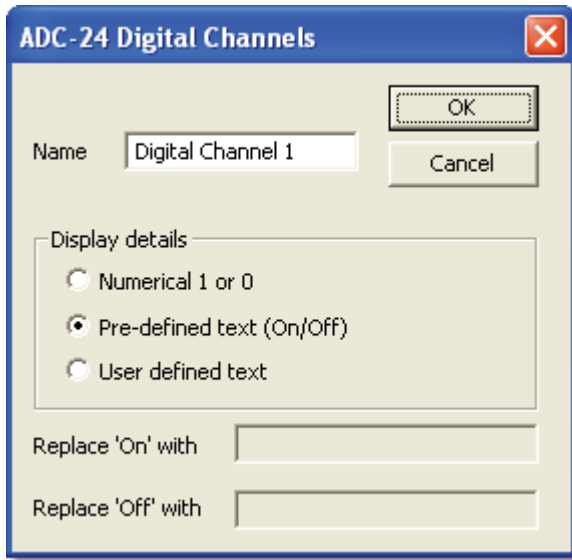
Name. This is the name of the channel. You can enter any name here, and it will appear on all reports.

Display details. This field specifies how PicoLog will display the digital channel on graphs and reports.

Replace 'On'/'Off' with. If you selected **User defined text** under **Display details**, you can type labels in these boxes to replace the words 'On' and 'Off'. PicoLog will display your labels in all graphs and reports.

5.2.4.4   ADC-20/ADC-24 Streaming

This dialog is used to select the channels and sampling rate for streaming recording. Access it via the **OK** button in the **Converter details** ⌐28⌐ dialog. This dialog is accessible only when **Recording method** has been set to **Streaming** in the **Recording** ⌐24⌐ dialog.
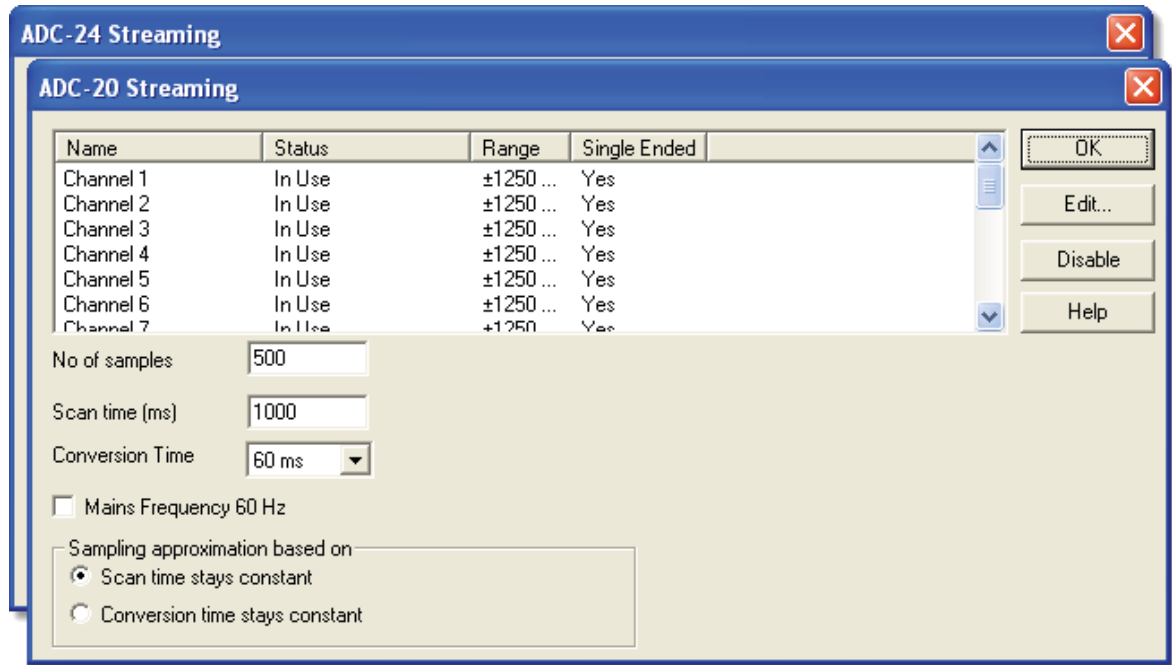
Edit. To edit a channel, highlight it and click the **Edit** button. This will open the **Edit ADC-20 Streaming Channel** ⌐59⌐ or **Edit ADC-24 Streaming Channel** ⌐59⌐ dialog so that you can enter the details.

Disable. To disable a channel, highlight it and click the **Disable** button.

No of samples. This specifies the number of samples to be taken during streaming.

Scan time (ms). This is the preferred time to take one set of samples from all the active channels.

Mains frequency 60 Hz. Tick this box if your mains (grid) frequency is 60 hertz. Otherwise, PicoLog will assume that your mains frequency is 50 hertz. The program uses this frequency to reject mains noise from your measurements.

Sampling approximation based on. When you click the **OK** button, PicoLog will attempt to negotiate the closest setting based on two user options:

● **Scan time stays constant** - the scan time will remain as close as possible to that requested, and the conversion time will be modified to fit the number of active channels in the scan time
● **Conversion time stays constant** - the conversion time will remain as close as possible to that requested, and the scan time will be modified.

If PicoLog has modified one of your timing specifications, it will display an asterisk (*) next to the parameter that it has adjusted. If the adjusted value is acceptable, click OK again and PicoLog will use the displayed settings. If not, change one of the specifications and try again.

5.2.4.5   Edit ADC-20/ADC-24 Streaming Channel

This dialog is used to enter the details for an analog channel.   To access it, highlight an available analog input channel in the **ADC-20 Streaming** 58 or **ADC-24 Streaming** 58 dialog and then click the **Edit...** button.
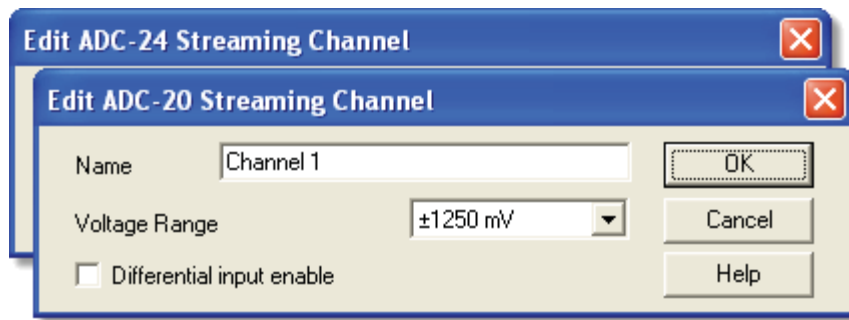
Name. This is the name of the channel. You can enter any name here, and it will appear on all graphs and reports.

Voltage range. Your data logger has two or more voltage ranges. Select a voltage range that just covers the range of signals that you wish to measure. Try not to select too large a range, as this will reduce the accuracy of your measurements.

Differential input enable. If you wish to measure the voltage difference between adjacent channels, tick this box. Only odd-numbered channels can be switched to differential mode. The adjacent even-numbered channel will be used as the negative input and will be marked as 'Unavailable' in the channel selection dialog. For example, if differential input is enabled for channel 1, the logger will measure the voltage difference between channel 1 and channel 2, and channel 2 will be marked as 'Unavailable'.

5.2.4.6   Device status

Accessed via the **Status** button in the **Converter details** 28 dialog.
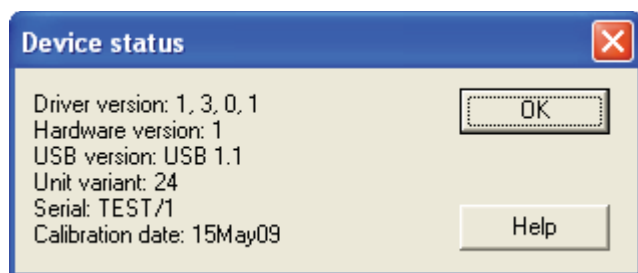
This dialog displays the details about the ADC connection to the computer.

5.2.5   ADC-100/101

5.2.5.1   ADC-100/101 measurements

To access this dialog, assuming you have already set up PicoLog with an ADC-100 or ADC-101 as your converter, select **Input channels...** from the **Settings** 22 menu.
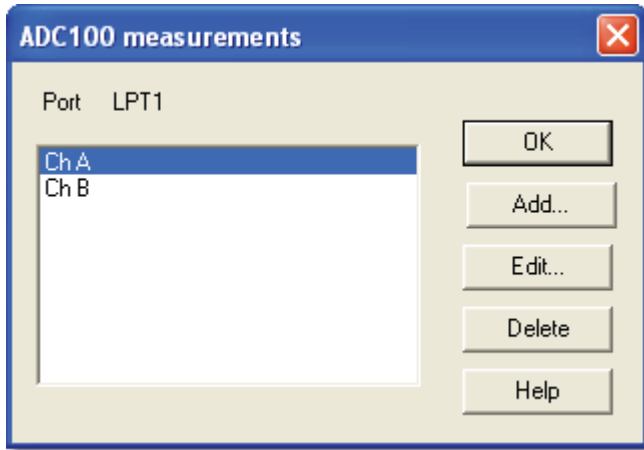
This dialog displays a list of the measurements that you wish to take.

Add. To add a measurement to the list, click the **Add** button. This will open a dialog so you can enter the details.

Edit. To edit a measurement in the list, highlight it and click the **Edit** button. This will open the **Edit ADC100/101 measurement** 60 dialog so that you can edit the details.

Delete. To delete a measurement in the list, highlight it and click **Delete**.

5.2.5.2   Edit ADC-100/101 measurement

Accessed via the **Edit** button in the **ADC100/101 measurements** 60 dialog.

This dialog is used to enter the details for a measurement.

Name. This is the name of the measurement. It will appear on all reports.

Channel. This is the channel to be used for the measurement.

Measurement. This specifies the type of measurement that will be made. The options are:

- DC volts - the DC component or average input voltage.
- AC volts - the RMS AC voltage (note that this excludes any DC component).
- dB - AC volts converted to decibels.
- Frequency - the frequency of the AC component, in hertz.

Voltage range. This specifies the voltage range for the measurement.

Scan time. This is the total time to take the set of readings for a sample. The scan time should be at least three cycles at the minimum frequency that you wish to measure.
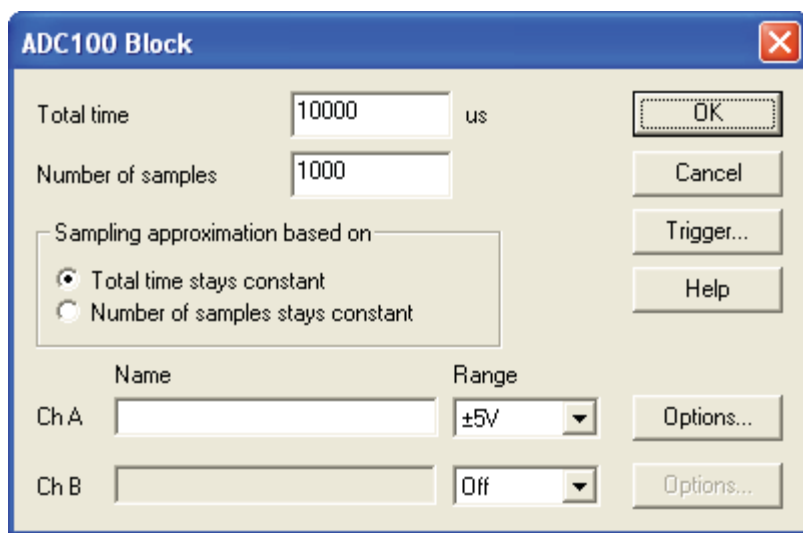
Options. To set the options for the measurement (such as units and scaling) click **Options**. This will open the **Parameter options** 34 dialog.

5.2.5.3   ADC-100 Block

Accessed via the **OK** button in the **Converter details** 28 dialog. Note: This dialog is accessible only when **Recording method** has been set to **Fast block** in the **Recording** 24 dialog.

This dialog only applies to the block method of recording. It is used to select the channels that will be used to take measurements.

Total time. This is the preferred time over which you want to collect the data.

Number of samples. This specifies the preferred number of samples to be taken during a block.

Sampling approximation based on. The ADC unit and the PC both have performance limits and will rarely be able to give exactly the settings that are requested. PicoLog will attempt to negotiate similar settings based on two user options:

- Total time stays constant - The time will remain very similar and the number of samples will be compromised
- Number of samples stays constant - The number of samples will remain very similar and the time will be compromised

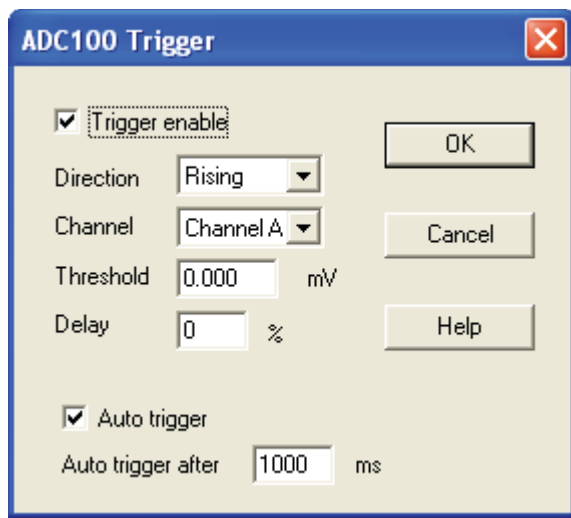**Name.** This is the name of the measurement. This name will appear on all reports.

Range. This specifies the voltage range for the measurement.

Trigger... To enter the trigger details for the measurement click the **Trigger...** button. This will open the **ADC100 Trigger** 62 dialog.

Options. To set the options for the measurement (such as units and scaling) click **Options**. This will open the **Parameter options** 34 dialog.

5.2.5.4   ADC-100 Trigger

Accessed via the **Trigger** button in the **ADC100 Block** 61 dialog.

Triggering is used to select the moment at which PicoLog collects data - usually at some fixed time before or after a trigger event.

A trigger event occurs when a specified channel crosses a voltage threshold - either rising or falling. PicoLog can start collecting data immediately after the trigger event, or a fixed time interval before or after the trigger event.

Trigger enable. If you wish to collect data only when the specified trigger conditions occur, check this box. If the box is not checked, data is displayed continuously.

Direction. The trigger direction can be either rising or falling. If rising is selected, the trigger event occurs when the voltage rises across the trigger threshold.

Channel. This selects which channel is to be used as the trigger input.

Threshold. This shows the voltage (in mV) that the trigger channel must cross in order for a trigger event to occur.

Delay. This controls the time delay, as a percentage of the sweep time, between the trigger event and the start of collecting data. A negative delay means that the computer will show data that was recorded before the trigger event - for example, - 50% places the trigger event in the middle of the collected data and -100% means that all data is collected before the trigger.

Auto trigger. If you wish PicoLog to trigger after a specified time - even if no trigger event occurs - check this box. This will prevent PicoLog from waiting indefinitely for the event and locking up the computer.

Note: If you disable auto-trigger and the computer does lock up, you can press the F9 key to simulate a trigger.

Auto trigger after. The time after which PicoLog will trigger, even if no trigger event occurs.

5.2.5.5   Device status

Accessed via the **Status** button in the **Converter details** ⌐28⌐ dialog.

This dialog displays details of the ADC status.

plw.en r5
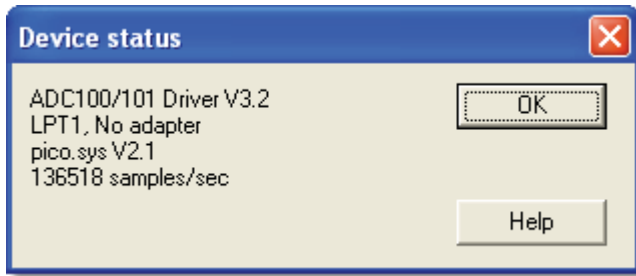
5.2.6   ADC-200/212/216

5.2.6.1   ADC-200 measurements

To access this dialog, assuming you have already set up PicoLog with an ADC-200 series converter, select **Input channels...** from the **Settings** 22 menu.

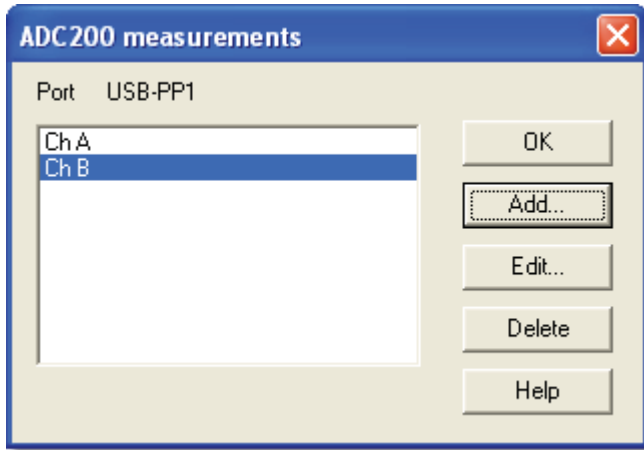This dialog displays a list of the measurements that you wish to take.

Add. To add a measurement to the list, click the **Add** button. This will open a dialog so you can enter the details.

Edit. To edit a measurement in the list, highlight it and click the **Edit** button. This will open the **Edit ADC200 measurement** 64 dialog so that you can edit the details.

Delete. To delete a measurement in the list, highlight it and click **Delete**.

5.2.6.2   Edit ADC-200 measurement

Accessed via the **Edit** button in the **ADC200 measurements** 64 dialog.

This dialog is used to enter the details for a measurement.

Name. This is the name of the measurement. It will appear on all reports.

Channel. This is the channel to be used for the measurement.

Measurement. This specifies the type of measurement that will be made. The options are:

- DC volts - the DC component or average input voltage.
- AC volts - the RMS AC voltage (note that this excludes any DC component).
- dB - AC volts converted to decibels.
- Frequency - the frequency of the AC component, in hertz.

Voltage range. This specifies the voltage range for the measurement.

Scan time. This is the total time to take the set of readings for a sample. The scan time should be at least three cycles at the minimum frequency that you wish to measure.

Options. To set the options for the measurement (such as units and scaling) click **Options**. This will open the **Parameter options** 34 dialog.

5.2.6.3   ADC-200 Block

Accessed via the **OK** button in the **Converter details** 28 dialog. Note: This dialog is only accessible when **Recording method** has been set to **Fast block** in the **Recording** 24 dialog.
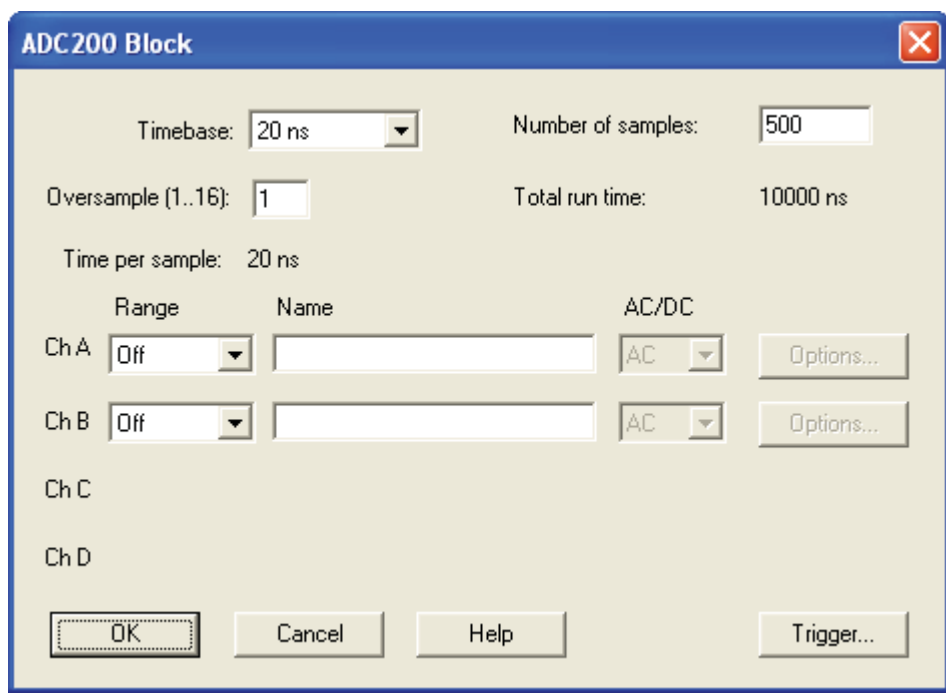
This dialog is used to select the sampling rate and channels for fast data recording.

Timebase. This is a list of the sample rates built into the ADC-200 series unit. Select one of the entries from this list.

Oversample. This is the number of individual readings to be used for each sample. If you select four, for example, each sample will be made up of four readings and the time per sample will be four times the timebase.

Number of samples. This specifies the number of samples to be taken during a block.

Total time. This is the time required to take the specified number of samples

Name. This is the name of the measurement. This name will appear on all reports.

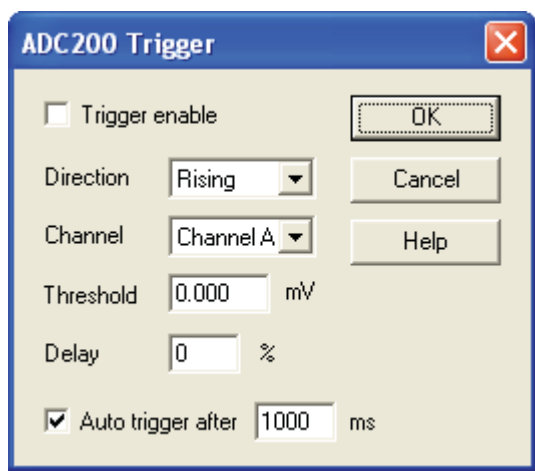**Range.** This specifies the voltage range for the measurement. Set to 'off' if the channel is not required.

AC/DC. This specifies whether the input is to be AC or DC coupled.

Trigger. To enter the trigger details for the measurement click the **Trigger** button. This will open the **ADC200 Trigger** 66 dialog.

Options. To set the options for the measurement (such as units and scaling) click **Options**. This will open the **Parameter options** 34 dialog.

5.2.6.4   ADC-200 Trigger

Accessed via the **Trigger** button in the **ADC200 Block** 65 dialog.

Triggering is used to select the moment at which PicoLog collects data - usually at some fixed time before or after a trigger event.

A trigger event occurs when a specified channel crosses a voltage threshold - either rising or falling. PicoLog can start collecting data immediately after the trigger event, or a fixed time interval before or after the trigger event.

Trigger enable. If you wish to collect data only when the specified trigger conditions occur, check this box. If the box is not checked, data is displayed continuously.

Direction. The trigger direction can be either rising or falling. If rising is selected, the trigger event occurs when the voltage rises across the trigger threshold.

Channel. This selects which channel is to be used as the trigger input.

Threshold. This shows the voltage (in mV) that the trigger channel must cross in order for a trigger event to occur.

Delay. This controls the time delay, as a percentage of the sweep time, between the trigger event and the start of collecting data. A negative delay means that the computer will show data that was recorded before the trigger event - for example, -50% places the trigger event in the middle of the collected data and -100% means that all data is collected before the trigger.

>**Auto trigger.** If you wish PicoLog to trigger after a specified time - even if no trigger event occurs - check this box. This will prevent PicoLog from waiting indefinitely for the event and locking up the computer.
>
>**Auto trigger after.** The time after which PicoLog will trigger, even if no trigger event occurs.

5.2.6.5   Device status

Accessed via the **Status** button in the **Converter details** 28 dialog.
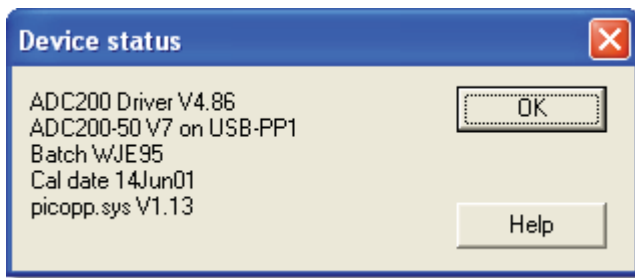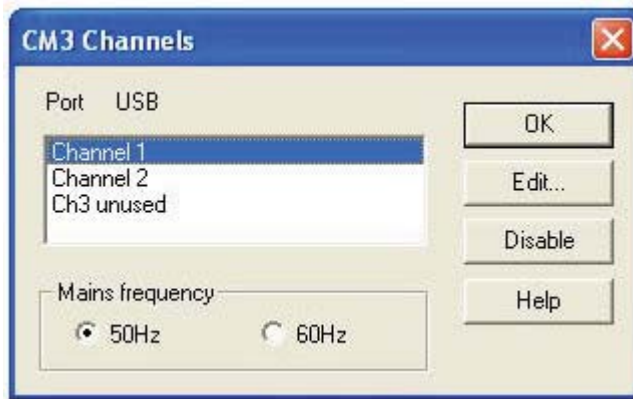

This dialog displays details of the ADC status.

5.2.7   PicoLog CM3

5.2.7.1   CM3 channels

To access this dialog, assuming you have already set up PicoLog with a CM3 unit, select **Input channels...** from the **Settings** ⌐22⌐ menu.

This dialog is used to select the channels that will be used to take measurements.

Edit. To select a channel, first highlight it, then click the **Edit...** button. This will open the **Edit CM3 Channel** ⌐68⌐ dialog so that you can enter the details.

Disable. To disable a previously selected channel, highlight it and then click the **Disable** button.

Mains Frequency. Select the mains (line) frequency according to your location.

5.2.7.2   Edit CM3 Channel

Accessed via the **Edit** button in the **CM3 channels** ⌐68⌐ dialog.

This dialog is used to enter the details for a channel.

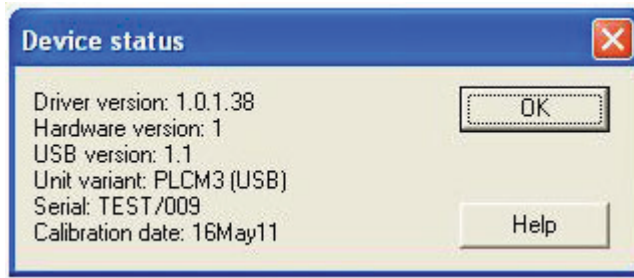**Name.** This is the name of the channel. This name will appear on all reports.

Data type. Select the appropriate settings for the sensor you are using.

Options. To set the options for a parameter ⌐34⌐, click the **Options...** button.

5.2.7.3   Device status

Accessed via the **Status** button in the **Converter details** 28 dialog.

This dialog displays details of the converter status.

5.2.8   PicoLog 1000 Series

5.2.8.1   PicoLog 1000 measurements

To access this dialog, assuming you have already set up PicoLog with a PicoLog 1000 Series converter as your converter, select **Input channels...** from the **Settings** ⌐22⌐ menu. Note: This dialog is accessible only when **Recording method** has been set to **Real time continuous** in the **Recording** ⌐24⌐ dialog.
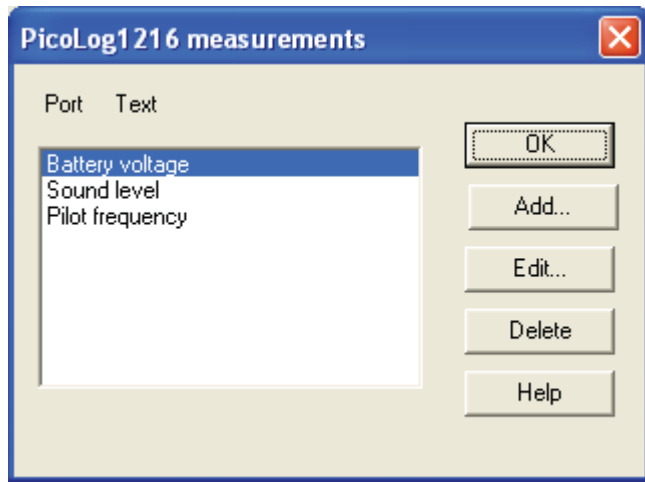
This dialog is used to build up a list of parameters to measure for a converter. On the left is the current list of measurements and on the right are buttons to update the list.
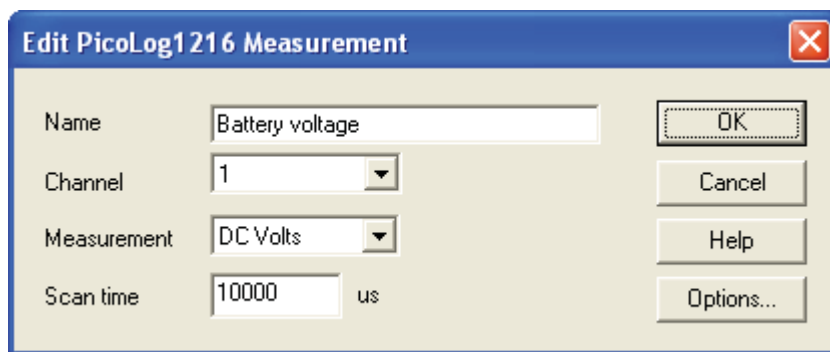
Add. To add a measurement to the list, click the **Add** button. This will open a dialog to enter details of the new measurement.

Edit. To edit a measurement in the list, highlight it and click **Edit**. This will open the **Edit PicoLog 1000 Series Measurement** ⌐70⌐ dialog so that you can edit the details.

Delete. To delete a measurement in the list, highlight it and click **Delete**.

5.2.8.2   Edit PicoLog 1000 Series Measurement

Accessed via the **Edit** button in the **PicoLog 1000 Series measurements** ⌐70⌐ dialog.

This dialog is used to enter the details for a measurement.

Name. This is the name of the measurement. It will appear on all reports.

Channel. This is the channel to be used for the measurement.

Measurement. This specifies the type of measurement that will be made. The options are:
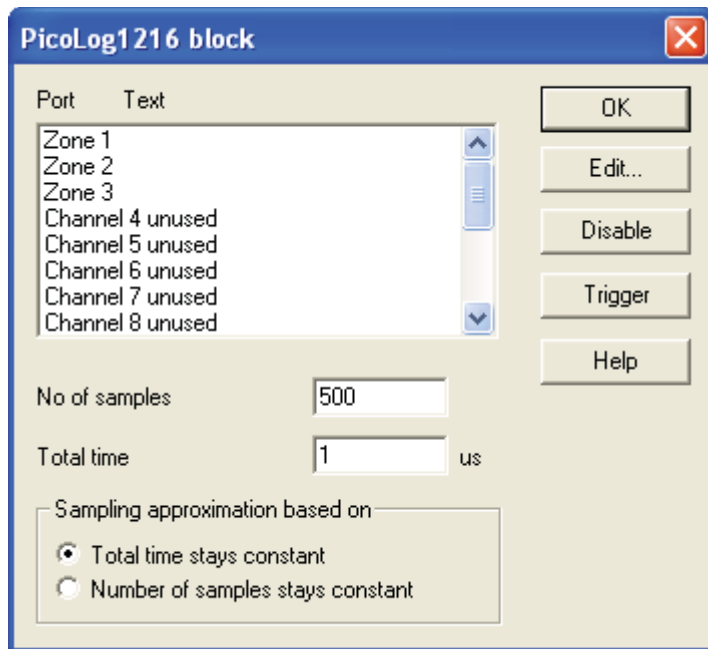
- 🔵 DC volts - the DC component or average input voltage.
- 🔵 AC volts - the RMS AC voltage (note that this excludes any DC component).
- 🔵 dB - AC volts converted to decibels.
- 🔵 Frequency - the frequency of the AC component, in hertz.

Scan time. This is the total time to take the set of readings for a sample. The scan time should be at least three cycles at the minimum frequency that you wish to measure.

Options. To set the options for the measurement (such as units and scaling) click **Options**. This will open the **Parameter options** 34 dialog.

5.2.8.3   PicoLog 1000 Series Block

Accessed via the **OK** button in the **Converter details** 28 dialog. Note: This dialog is accessible only when **Recording method** has been set to **Fast block** in the **Recording** 24 dialog.

This dialog is used to select the channels and sampling rate for fast recording.

Edit. To select a channel, highlight it and click **Edit**. This will open the **Edit Channel** dialog so that you can enter the details.

Number of samples. This specifies the preferred number of samples to be taken during a block.

Total time. This is the preferred time over which you want to collect the specified number of samples.

Sampling approximation. The ADC unit and the PC both have performance limits and will rarely be able to give exactly the settings that are requested. PicoLog will attempt to negotiate similar settings based on two user options:

- 🔵 **Total time stays constant** - The time will remain very similar and the number of samples will be adjusted

🔵 **Number of samples stays constant** - The number of samples will remain very similar and the time will be adjusted

When you click the **OK** button, the following dialog will appear to check whether the negotiated settings are acceptable (the dialog below does not represent the actual settings for this ADC):
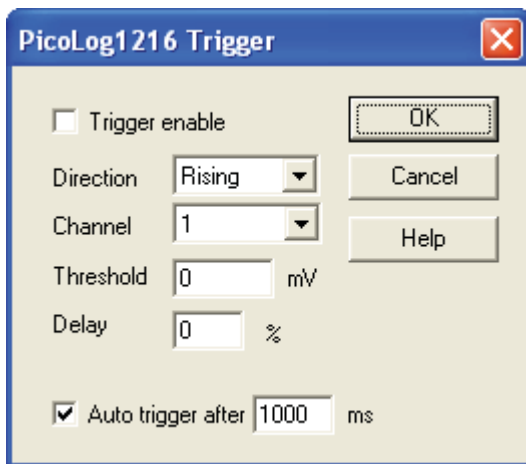

Disable. To disable a measurement in the list, highlight it and click **Disable**.

Trigger. To enter the trigger details for a measurement, highlight it and click **Trigger**. This will open the **ADC11/22 Trigger** 51 dialog.

5.2.8.4   PicoLog 1000 Series Trigger

Accessed via the **Trigger** button in the **PicoLog 1000 Series block** 71 dialog. This is accessible when the Recording method has been set to Fast block in the Recording 24 dialog.

Triggering is used to select the moment at which PicoLog starts collects data - usually at some fixed time before or after a trigger event.

A trigger event occurs when the specified channel crosses a voltage threshold - either rising or falling. PicoLog can start collecting data immediately after the trigger event, or a fixed time interval before or after the trigger event.

Trigger enable. If you wish to collect data only when the specified trigger conditions occur, check this box. If the box is not checked, data is displayed continuously.

Direction. The trigger direction can be either rising or falling. If rising is selected, the trigger event occurs when the voltage rises across the trigger threshold.

Channel. This selects which channel is to be used as the trigger input.

Threshold. This shows the voltage (in mV) that the trigger channel must cross in order for a trigger event to occur.

Delay. This controls the time delay, as a percentage of the sweep time, between the trigger event and the start of collecting data. A negative delay means that the computer will show data that was recorded before the trigger event - for example, -50% places the trigger event in the middle of the collected data and -100% means that all data is collected before the trigger.

Auto trigger. If you wish PicoLog to trigger after a specified time - even if no trigger event occurs - check this box. This will prevent PicoLog from waiting indefinitely for the event and locking up the computer.

Note: If you disable auto-trigger and the computer does lock up, you can press the F9 key to simulate a trigger.

Auto trigger after. The time after which PicoLog will trigger, even if no trigger event occurs.

5.2.8.5   Device status

Accessed via the **Status** button in the **Converter details** ⟨28⟩ dialog.
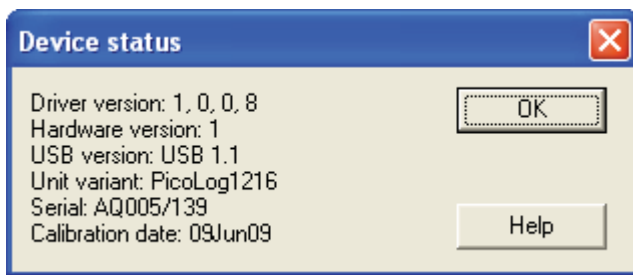

This dialog displays the details about the ADC connection to the server.

5.2.9   PicoScope 2000 Series

5.2.9.1   PicoScope 2000 Measurements

To access this dialog, assuming you have already set up PicoLog with a PicoScope 2000 series unit, select **Input channels...** from the **Settings** 22 menu and click **OK**. Note: This is accessible only when the **Recording method** has been set to **Real time continuous** in the **Recording** 24 dialog.
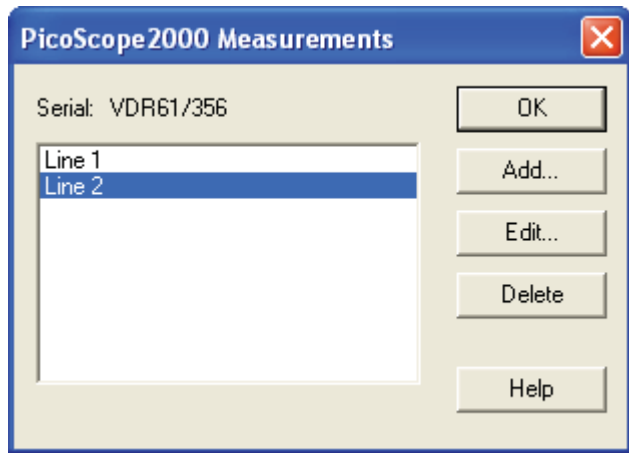
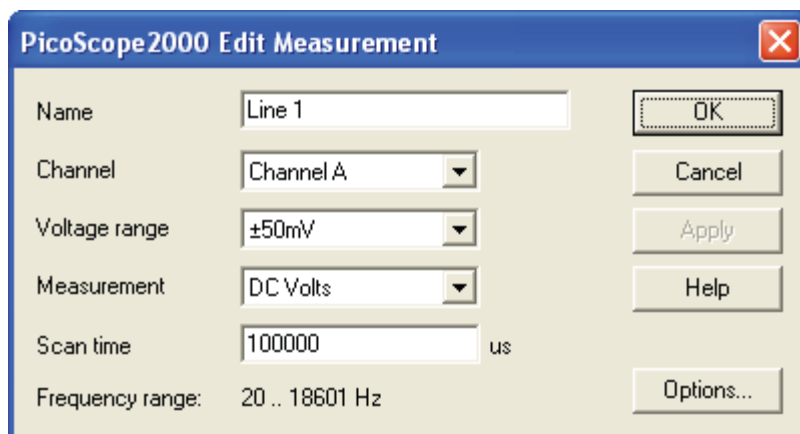This dialog displays a list of the measurements that you wish to take.

Add. To add a measurement to the list, click **Add**. This will open the **PicoScope2000 Edit Measurement** 74 dialog so you can enter the details.

Edit. To edit a measurement in the list, highlight it and click **Edit**. This will open the **PicoScope2000 Edit Measurement** 74 dialog so that you can edit the details.

Delete. To delete a measurement in the list, highlight it and click **Delete**.

5.2.9.2   PicoScope 2000 Edit Measurement

Accessed via the **Edit** button in the **PicoScope2000 Measurements** 74 dialog.

This dialog is used to enter the details for a measurement.

Name. This is the name of the measurement. It will appear on all reports.

Channel. This is the channel to be used for the measurement.

Measurement. This specifies the type of measurement that will be made. The options are:

● DC volts - the DC component or average input voltage.
● AC volts - the RMS AC voltage (note that this excludes any DC component).
● dB - AC volts converted to decibels.
● Frequency - the frequency of the AC component, in hertz.

Voltage range. This specifies the voltage range for the measurement.

Scan time. This is the total time to take the set of readings for a sample. The frequency range available at the selected scan time is displayed below this field ... the frequency range will set the default maximum / minimum limits of the **PLW Graph** 8 window when the Measurement: 'Frequency' is selected.

Options. To set the options for the measurement (such as units and scaling) click **Options**. This will open the **Parameter options** 34 dialog.

5.2.9.3   PicoScope 2000 Block Mode

Accessed via the **OK** button in the **Converter details** 28 dialog. Note: This dialog is accessible only when **Recording method** has been set to **Fast block** in the **Recording** 24 dialog.
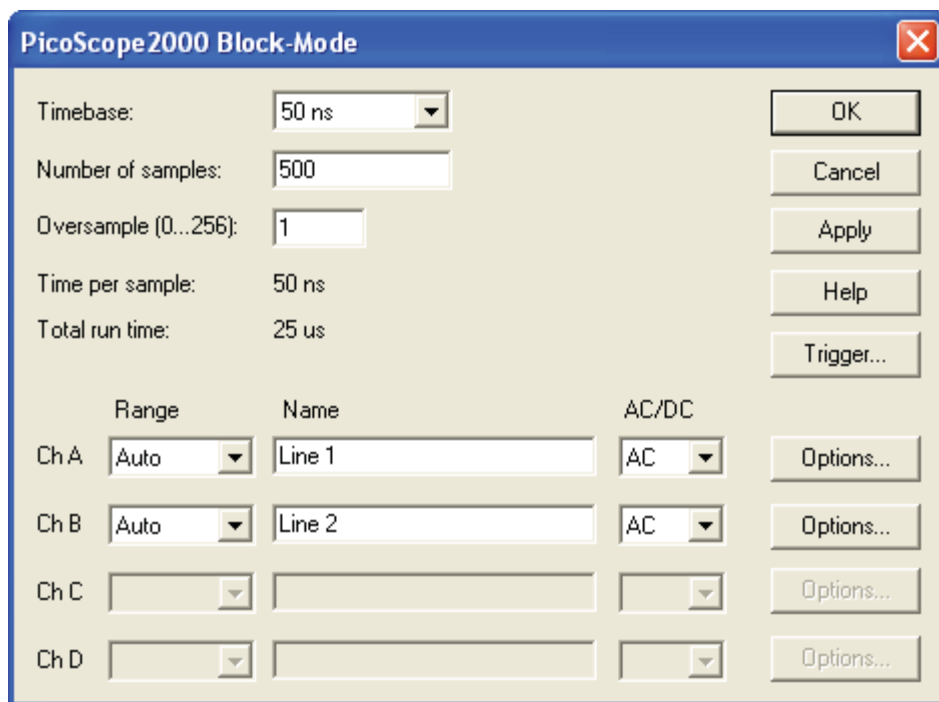
This dialog is used to select the sampling rate and channels for fast data recording.

Timebase. This is a list of the sample rates built into the Picoscope 2000 unit. Select one of the entries from this list.

Note: Available timebases vary depending on the PicoScope 2000 Series variant that you are using, and other settings, such as the number of channels that are active.

Number of samples. This specifies the number of samples to be taken during a block.

Oversample (0...256). The number of individual readings to be used for each sample. The oversample factor is limited by other settings such as the **Timebase** and the **Number of samples**. The effect of oversampling is to increase the requested number of samples by the oversample factor, then average them per sample to give an effective resolution increase.

The effective resolution increase (in bits) is calculated as below:

```
(Resolution Increase) = log10 (Oversample Factor) / log10 (2)
```

Total run time. This is the time required to take the specified number of samples.

Range. This specifies the voltage range for the measurement. Set to **Off** if the channel is not required.

The **Auto** option causes the scope to spend a maximum of 2 seconds per channel capturing data before it chooses a suitable voltage range this will delay the start of a data capture, and the range will stay fixed once the data capture has begun. An **Auto-ranging** dialog will be displayed to warn you when this is happening.

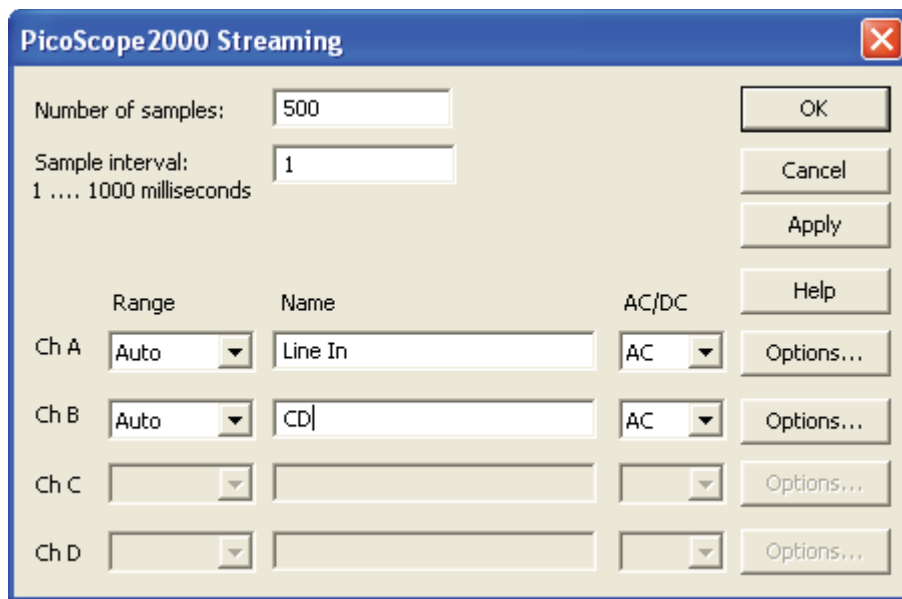**Name.** This is the name of the measurement. It will appear on all reports.

AC/DC. This specifies whether the input is to be AC or DC coupled.

Trigger... To enter the trigger details for the measurement click the **Trigger...** button. This will open the **PicoScope2000 Trigger** 77 dialog.

Options. To set the options for the measurement (such as units and scaling) click **Options**. This will open the **Parameter options** 34 dialog.

5.2.9.4   PicoScope 2000 Streaming

Accessed via the **OK** button in the **Converter details** 28 dialog. Note: This dialog is accessible only when **Recording method** has been set to **Streaming** in the **Recording** 24 dialog.

This dialog is used to select the sampling rate and channels for streaming data recording.

Number of samples. This specifies the number of samples to be taken during the recording.

Sample interval. This is the time between successive samples.

Range. This specifies the voltage range for the measurement. Set to **Off** if the channel is not required.

The **Auto** option simply sets the voltage range to its largest value and leaves it there for the duration of the recording.
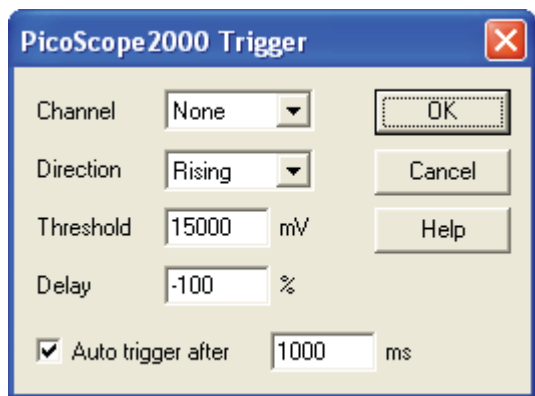
Name. This is the name of the measurement. It will appear on all reports.

AC/DC. This specifies whether the input is to be AC or DC coupled.

Options. To set the options for the measurement (such as units and scaling) click **Options**. This will open the **Parameter options** ⌐34⌐ dialog.

5.2.9.5   PicoScope 2000 Trigger

Accessed via the **Trigger...** button in the **PicoScope2000 Block-Mode** ⌐75⌐ dialog.

Triggering is used to select the moment at which PicoLog starts collecting data - usually at some fixed time before or after a trigger event.

A trigger event occurs when a specified channel crosses a voltage threshold - either rising or falling. PicoLog can start collecting data immediately after the trigger event, or a fixed time interval before or after the trigger event.

Channel. This selects which channel is to be used as the trigger input. Select **None** if a trigger is not required.

Note: PicoLog will allow you to trigger on a channel that is not capturing data. However, the channel will need to be activated, and therefore other settings may be affected ... such as the available timebases. If you need to trigger on an inactive channel, we recommend that you use the External Trigger Input.

Direction. The trigger direction can be either rising or falling. If rising is selected, the trigger event occurs when the voltage rises across the trigger threshold.

Threshold. This shows the voltage (in millivolts) that the trigger channel must cross in order for a trigger event to occur.

Delay. This controls the time delay, as a percentage of the sweep time, between the trigger event and the start of collecting data. A negative delay means that the computer will show data that was recorded before the trigger event; for example, -50% places the trigger event in the middle of the collected data and -100% means that all data is collected before the trigger.

Note: When a negative delay is selected, the unit will need to buffer enough data before the trigger point. This will stop the unit triggering until it has collected the minimum number of data points.

Auto trigger. If you wish PicoLog to trigger after a specified time - even if no trigger event occurs - check the **Auto** trigger box.

Auto trigger after. The time after which PicoLog will trigger automatically, even if no trigger event occurs (only used if the Auto-trigger is enabled).

5.2.9.6   Device status

Accessed via the **Status** button in the **Converter details** 28 dialog.
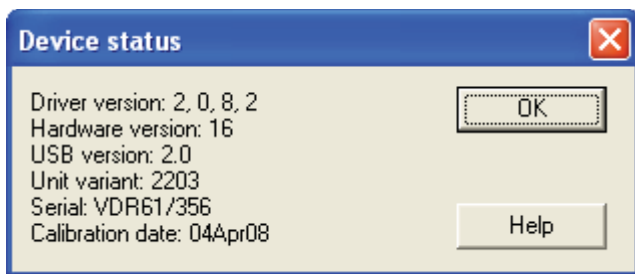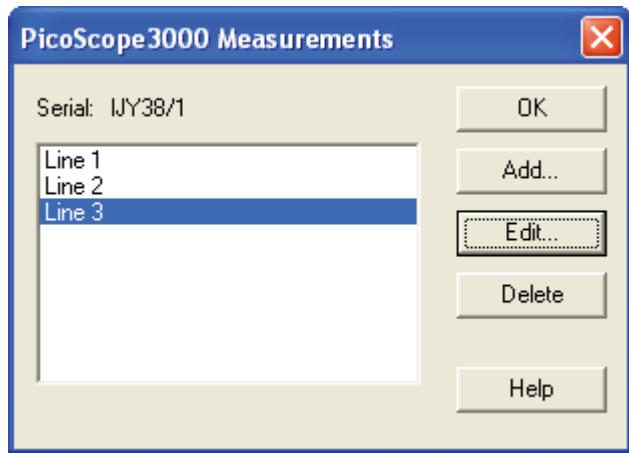

This dialog displays details of the ADC status.

5.2.10   PicoScope 3000 Series

5.2.10.1   PicoScope 3000 Measurements

To access this dialog, assuming you have already set up PicoLog with a PicoScope 3000 series unit, select **Input channels...** from the **Settings** [22] menu and click **OK**. Note: This is accessible only when the **Recording method** has been set to **Real time continuous** on the **Recording** [24] dialog.

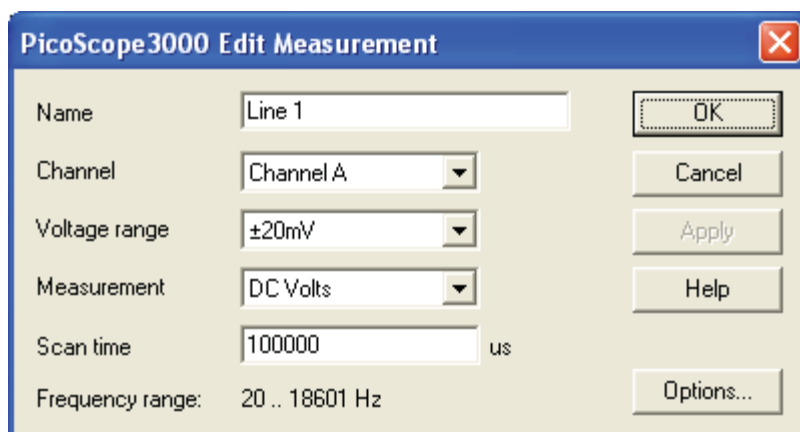This dialog displays a list of the measurements that you wish to take.

Add. To add a measurement to the list, click the **Add** button. This will open the **PicoScope3000 Edit Measurement** [79] dialog so you can enter the details.

Edit. To edit a measurement in the list, highlight it and click the **Edit** button. This will open the **PicoScope3000 Edit Measurement** [79] dialog so that you can edit the details.

Delete. To delete a measurement in the list, highlight it and click **Delete**.

5.2.10.2   PicoScope 3000 Edit Measurement

Accessed via the **Edit** button in the **PicoScope3000 Measurements** [79] dialog.

This dialog is used to enter the details for a measurement.

Name. This is the name of the measurement. It will appear on all reports.

Channel. This is the channel to be used for the measurement.

Measurement. This specifies the type of measurement that will be made. The options are:

- DC volts - the DC component or average input voltage.
- AC volts - the RMS AC voltage (note that this excludes any DC component).
- dB - AC volts converted to decibels.
- Frequency - the frequency of the AC component, in hertz.

Voltage range. This specifies the voltage range for the measurement.

Scan time. This is the total time to take the set of readings for a sample. The frequency range available at the selected scan time is displayed below this field ... the frequency range will set the default maximum / minimum limits of the **PLW Graph** 8ⁿ window when the Measurement is set to **Frequency**.

Options. To set the options for the measurement (such as units and scaling) click **Options**. This will open the **Parameter options** 34ⁿ dialog.

5.2.10.3   PicoScope 3000 Block Mode

Accessed via the **OK** button in the **Converter details** 28ⁿ dialog. Note: This dialog is accessible only when **Recording method** has been set to **Fast block** in the **Recording** 24ⁿ dialog.
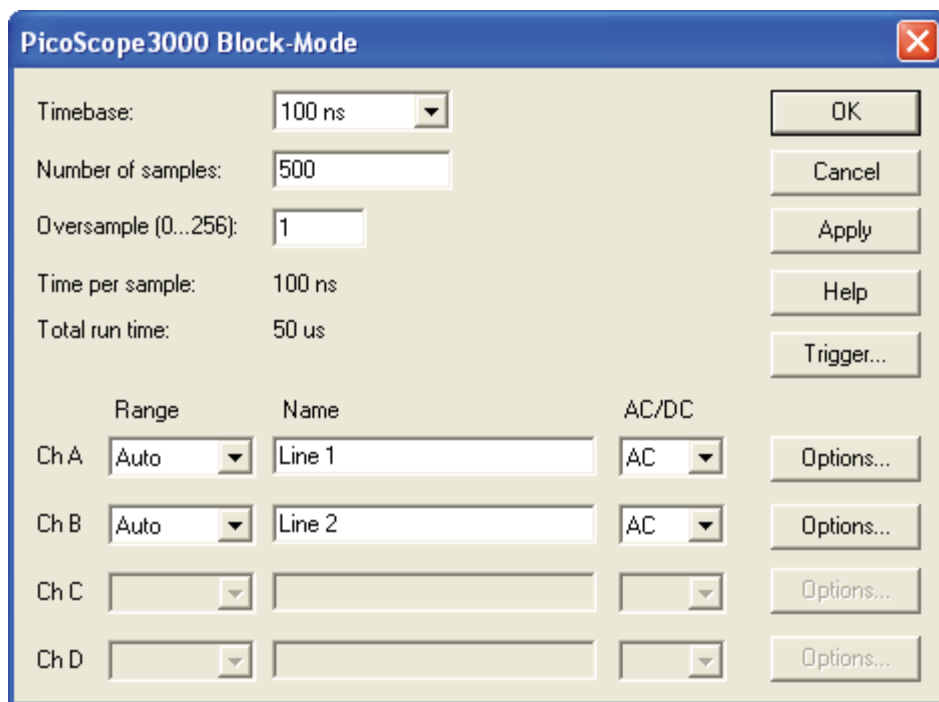
This dialog is used to select the sampling rate and channels for fast data recording.

Timebase. This is a list of the sample rates built into the Picoscope 3000 Series unit. Select one of the entries from this list.

Note: Available timebases vary depending on the PicoScope 3000 Series variant that you own, and other settings, such as the number of channels that are active.

Number of samples. This specifies the number of samples to be taken during a block.

Oversample (0...256). This is the number of individual readings to be used for each sample. The oversample factor is limited by other settings such as **Timebase** and **Number of samples**. The effect of oversampling is to increase the requested number of samples by the oversample factor, then average them per sample to give an effective resolution increase.

The effective resolution increase (in bits) is calculated as below:

```
(Resolution Increase) = log10 (Oversample Factor) / log10 (2)
```

Total run time. This is the time required to take the specified number of samples.

Range. This specifies the voltage range for the measurement. Set to 'Off' if the channel is not required.

The **Auto** option causes the scope to spend a maximum of 2 seconds per channel capturing data before it chooses a suitable voltage range this will delay the start of a data capture, and the range will stay fixed once the data capture has begun. An **Auto-ranging** dialog will be displayed to warn you when this is happening.

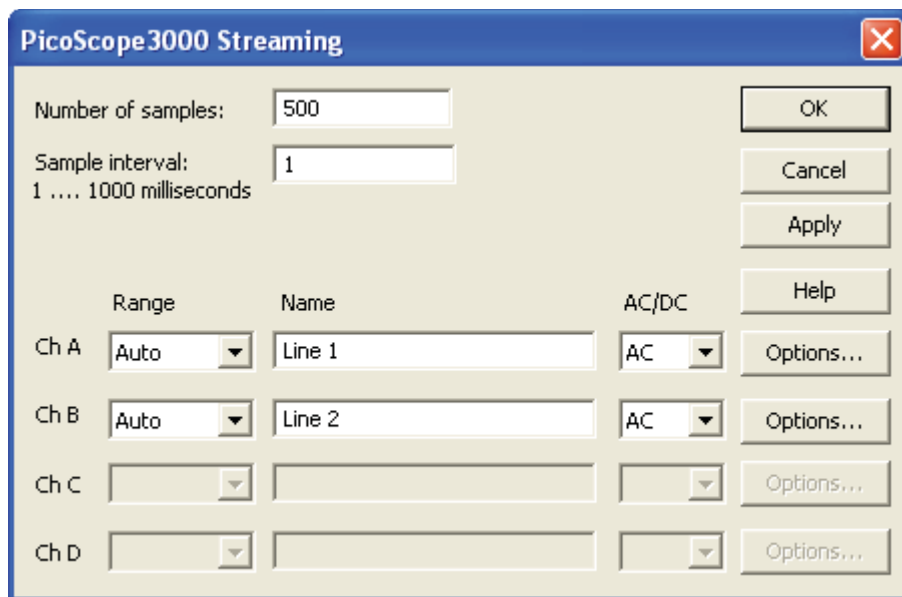**Name.** This is the name of the measurement. It will appear on all reports.

AC/DC. This specifies whether the input is to be AC or DC coupled.

Trigger... To enter the trigger details for the measurement click the **Trigger...** button. This will open the **PicoScope3000 Trigger** 82 dialog.

Options. To set the options for the measurement (such as units and scaling) click **Options**. This will open the **Parameter options** 34 dialog.

5.2.10.4   PicoScope 3000 Streaming

Accessed via the **OK** button in the **Converter details** 28 dialog. Note: This dialog is accessible only when **Recording method** has been set to **Streaming** on the **Recording** 24 dialog.

This dialog is used to select the sampling rate and channels for streaming data recording.

Number of samples. This specifies the number of samples to be taken during the whole recording.

Sample interval. This is the time between successive samples.

Range. This specifies the voltage range for the measurement. Set to **Off** if the channel is not required.

The **Auto** option simply sets the voltage range to its widest setting, and leaves it there for the duration of the recording.
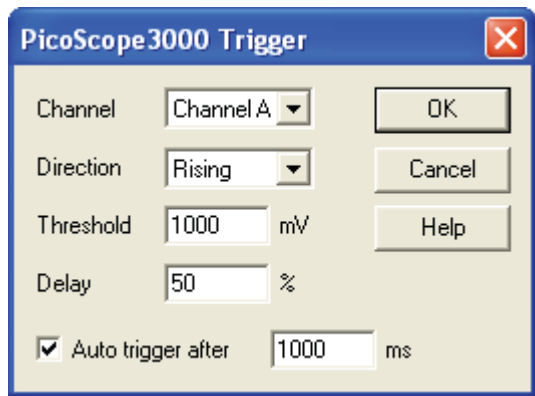
Name. This is the name of the measurement. This name will appear on all reports.

AC/DC. This specifies whether the input is to be AC or DC coupled.

Options. To set the options for the measurement (such as units and scaling) click **Options**. This will open the **Parameter options** 34 dialog.

5.2.10.5   PicoScope 3000 Trigger

Accessed via the **Trigger...** button in the **PicoScope3000 Block-Mode** 80 dialog.

Triggering is used to select the moment at which PicoLog starts collecting data - usually at some fixed time before or after a trigger event.

A trigger event occurs when a specified channel crosses a voltage threshold - either rising or falling. PicoLog can start collecting data immediately after the trigger event, or a fixed time interval before or after the trigger event.

Channel. This selects which channel is to be used as the trigger input. Select **None** if a trigger is not required.

Note: PicoLog will allow you to trigger on a channel that is not capturing data. However, the channel will need to be activated, and therefore other settings may be affected ... such as the available timebases. If you need to trigger on an inactive channel, we recommend that you use the External Trigger Input.

Direction. The trigger direction can be either rising or falling. If rising is selected, the trigger event occurs when the voltage rises across the trigger threshold.

Threshold. This shows the voltage (in millivolts) that the trigger channel must cross in order for a trigger event to occur.

Delay. This controls the time delay, as a percentage of the sweep time, between the trigger event and the start of collecting data. A negative delay means that the computer will show data that was recorded before the trigger event; for example, -50% places the trigger event in the middle of the collected data and -100% means that all data is collected before the trigger.

Note: When a negative delay is selected, the unit will need to buffer enough data before the trigger point. This will stop the unit triggering until it has collected the minimum number of data points.

Auto trigger. If you wish PicoLog to trigger after a specified time - even if no trigger event occurs - check this box.

Auto trigger after. The time after which PicoLog will trigger automatically, even if no trigger event occurs (only used if the Auto-trigger is enabled).

5.2.10.6   Device status

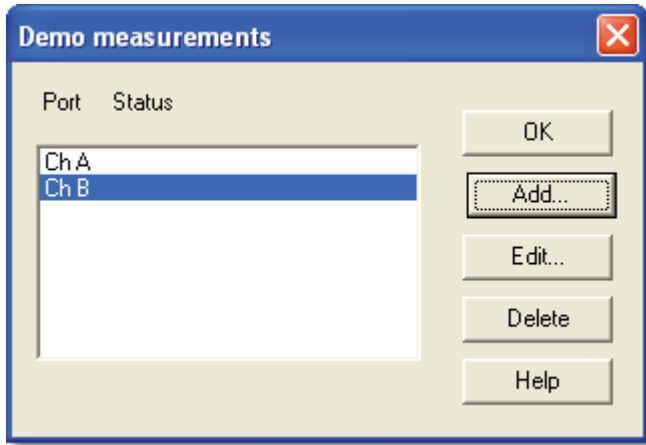Accessed via the **Status** button in the **Converter details** 28 dialog.
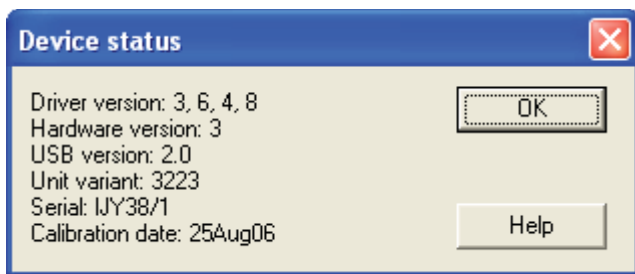
This dialog displays details of the ADC status.

5.2.11   Demo

5.2.11.1   Demo measurements

To access this dialog, assuming you have opened the demo version of PicoLog, select **Input channels...** from the **Settings** ⌐22⌐ menu.

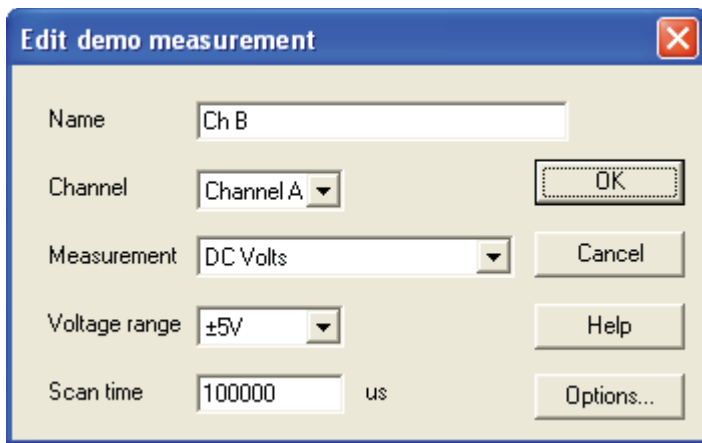This dialog displays a list of the measurements that you wish to take.

Add. To add a measurement to the list, click the **Add** button. This will open the **Edit demo measurement** ⌐84⌐ dialog so you can enter the details.

Edit. To edit a measurement in the list, highlight it and click **Edit**. This will open the **Edit demo measurement** ⌐84⌐ dialog so that you can edit the details.

Delete. To delete a measurement in the list, highlight it and click **Delete**.

5.2.11.2   Edit demo measurement

Accessed via the **Edit** button in the **Demo measurements** ⌐84⌐ dialog.

This dialog is used to enter the details for a measurement.

Name. This is the name of the measurement. It will appear on all reports.

Channel. This is the channel to be used for the measurement.

Measurement. This specifies the type of measurement that will be made. The options are:

- DC volts - the DC component or average input voltage.
- AC volts - the RMS AC voltage (note that this excludes any DC component).
- dB - AC volts converted to decibels.
- Frequency - the frequency of the AC component, in hertz.

Voltage range. This specifies the voltage range for the measurement.

Scan time. This is the total time to take the set of readings for a sample. The scan time should be at least three cycles at the minimum frequency that you wish to measure.

Options. To set the options for the measurement (such as units and scaling) click **Options**. This will open the **Parameter options** ⌐34⌐ dialog.

5.2.11.3   Demo block

Accessed via the **OK** button in the **Converter details** ⌐28⌐ dialog. Note: This dialog is only accessible when **Recording method** has been set to **Fast block** in the **Recording** ⌐24⌐ dialog.
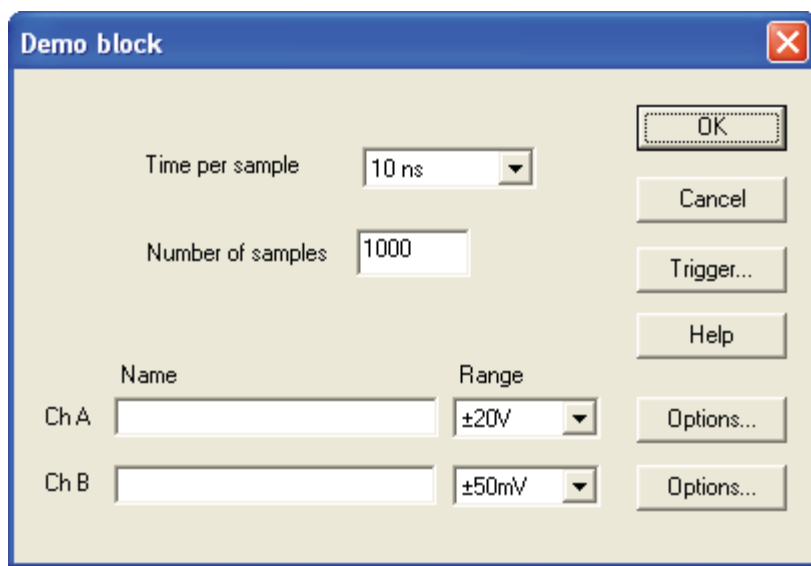
This dialog only applies to the block method of recording. It is used to select the channels that will be used to take measurements.

Time per sample. The timing is set in the unit itself, so the time per sample is guaranteed. Choose from the given list.

Total time. This is the time over which you want to collect the data. If this is not long enough, more time will automatically be taken.

Number of samples. This specifies the number of samples to be taken during a block.

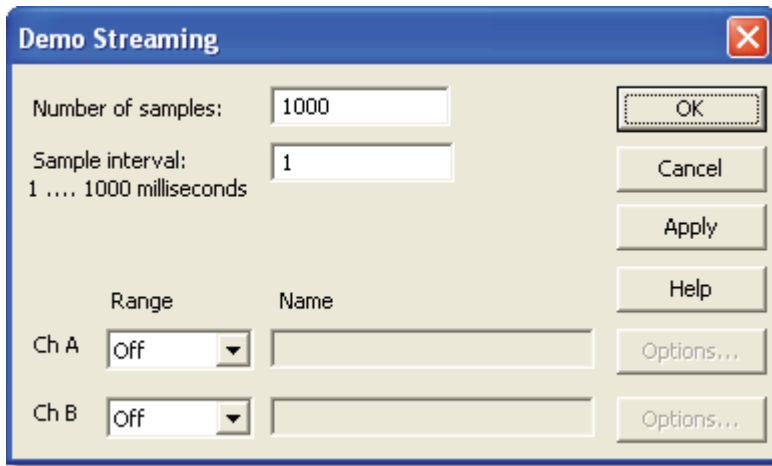**Name.** This is the name of the measurement. It will appear on all reports.

Range. This specifies the voltage range for the measurement.

Trigger. To enter the trigger details for the measurement click the **Trigger...** button. This will open the **Demo Trigger** 87 dialog.

Options. To set the options for the measurement (such as units and scaling) click **Options**. This will open the **Parameter options** 34 dialog.

5.2.11.4   Demo streaming

Accessed via the **OK** button in the **Converter details** 28 dialog. Note: This dialog is only accessible when **Recording method** has been set to **Fast block** on the **Recording** 24 dialog.

This dialog only applies to the block method of recording. It is used to select the channels that will be used to take measurements.

Number of samples. This specifies the number of samples to be taken during the whole recording.

**Sample interval.** The time between successive samples.

Range. This specifies the voltage range for the measurement.

Name. This is the name of the measurement. It will appear on all reports.

Options. To set the options for the measurement (such as units and scaling) click **Options**. This will open the **Parameter options** 34 dialog.

5.2.11.5   Demo trigger

Accessed via the **Trigger** button in the **Demo block** |87⏋ dialog.
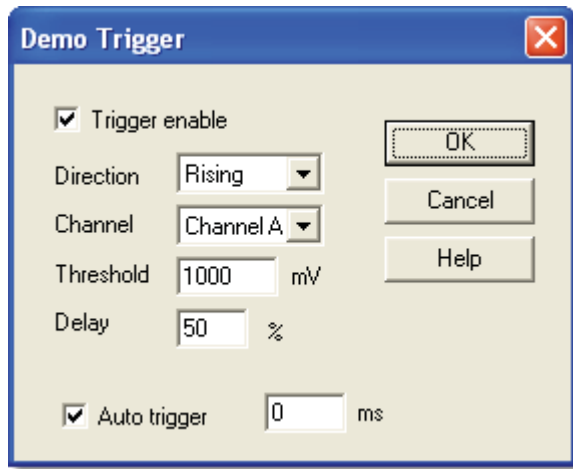
Triggering is used to select the moment at which PicoLog collects data - usually at some fixed time before or after a trigger event.

A trigger event occurs when a specified channel crosses a voltage threshold - either rising or falling. PicoLog can start collecting data immediately after the trigger event, or a fixed time interval before or after the trigger event.

Trigger enable. If you wish to collect data only when the specified trigger conditions occur, check the Trigger Enable box. If the box is not checked, data is displayed continuously.

Direction. The trigger direction can be either rising or falling. If rising is selected, the trigger event occurs when the voltage rises across the trigger threshold.

Channel. This selects which channel is to be used as the trigger input.

Threshold. This shows the voltage (in mV) that the trigger channel must cross in order for a trigger event to occur.

Delay. This controls the time delay, as a percentage of the sweep time, between the trigger event and the start of collecting data. A negative delay means that the computer will show data that was recorded before the trigger event - for example, -50% places the trigger event in the middle of the collected data and -100% means that all data is collected before the trigger.

Auto trigger. If you wish PicoLog to trigger after a specified time - even if no trigger event occurs - check this box. This will prevent PicoLog from waiting indefinitely for the event and locking up the computer.

Auto trigger after. The time after which PicoLog will trigger if no trigger event occurs.

5.2.11.6   Device status

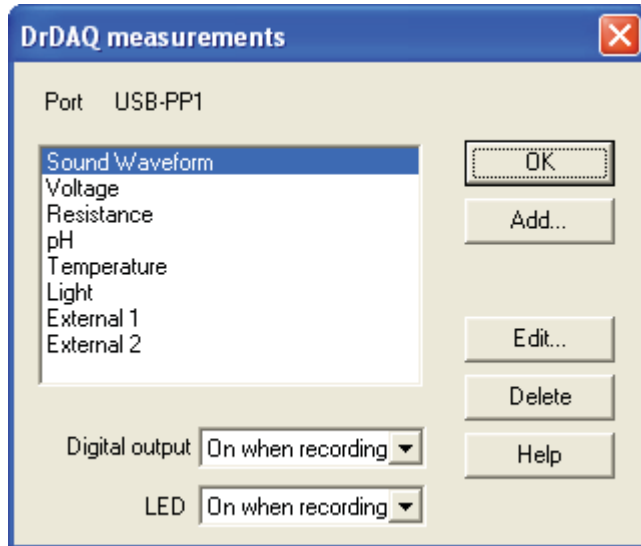Accessed via the **Status** button in the **Converter details** 28 dialog.
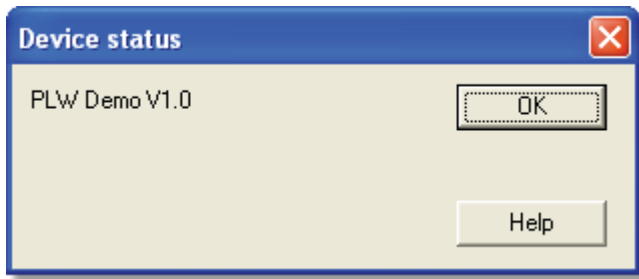
This dialog displays details of the ADC status.

5.2.12   DrDAQ

5.2.12.1   DrDAQ measurements

To access this dialog, assuming you have already set up PicoLog with a DrDAQ unit, select **Input channels...** from the **Settings** ⃞22 menu.

This dialog is used to build up a list of measurements to measure for a converter. On the left is the current list of measurements and on the right are buttons to update the list.

Add. To add a measurement to the list, click the **Add...** button. This will open the a dialog to enter details of the new measurement.

Edit. To edit a measurement in the list, highlight it and click the **Edit...** button. This will open the **Edit DrDAQ Measurement** ⃞90 dialog so that you can edit the details.
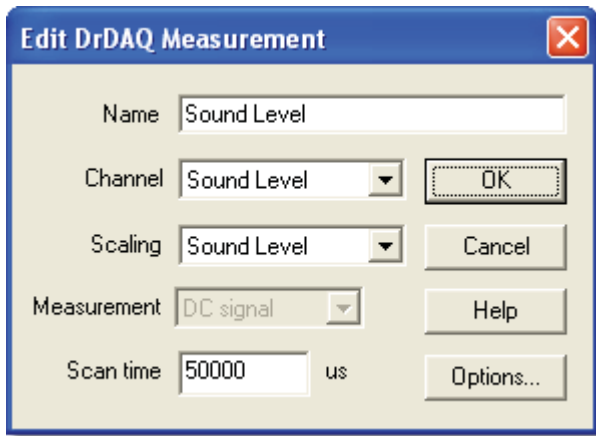
Delete. To delete a measurement in the list, highlight it and click **Delete**.

At the bottom are controls to determine when the digital output and the LED are to be turned on. The options are:

- **Always on** - the output is always on
- **On when recording** - the output is on whilst PicoLog is recording
- **Off during alarm** - the output is turned on when no alarm condition is present
- **On during alarm** - the output is turned on when an alarm condition is present

5.2.12.2   Edit DrDAQ Measurement

Accessed via the **Edit** button in the **DrDAQ measurements** 89 dialog.

This dialog is used to enter the details for a measurement.

Name. This is the name of the measurement. It will appear on all reports.

Channel. This is the channel to be used for the measurement.

Scaling. For some sensors, more than one scaling is available. If so, this option is used to select the scaling that you wish to use.

Measurement. This specifies the type of measurement that will be made. The options are:

🔵 **DC signal** - the DC component or average input signal.
🔵 **AC signal** - the RMS AC signal (note that this excludes any DC component).
🔵 **Frequency** - the frequency of the AC component, in hertz.

Note: **AC signal** and **Frequency** are not available for slowly changing channels

Scan time. PicoLog takes a set of readings at high speed and then uses these readings to calculate the selected measurement (**DC signal**, **AC signal** or **Frequency**). The scan time is the total time to take the set of readings for this measurement.
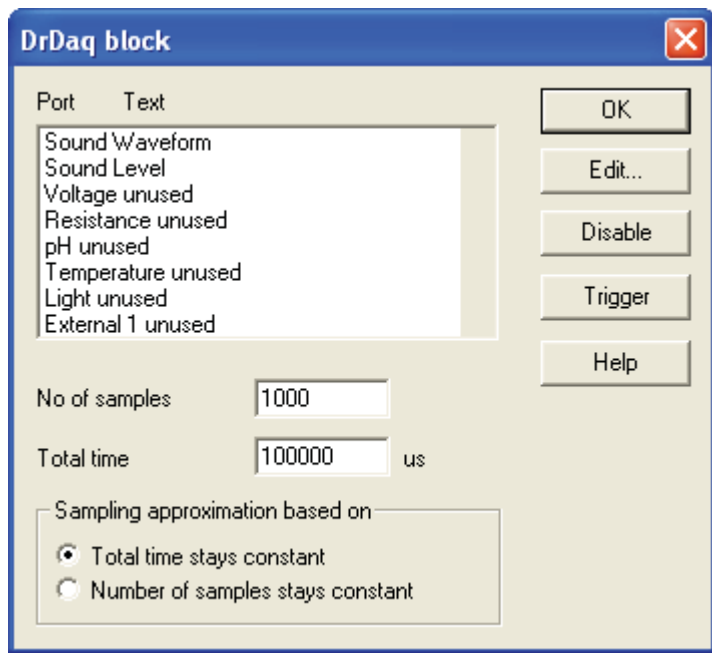
When making **DC signal** measurements, a longer scan time will reduce the effects of noise. Note, however, that the sum of the scan times for all channels must not exceed the sampling interval used for recording.

When making **AC signal** or **Frequency** measurements, the scan time should be at least three cycles at the minimum frequency that you wish to measure. For example, if you wish to measure a 50 Hz AC signal, one cycle is 20 ms, and three cycles are 60 ms.

Options. To set the options for the measurement (such as units and scaling) click **Options**. This will open the **Parameter options** 34 dialog.

5.2.12.3   DrDAQ block

Accessed via the **OK** button in the **Converter details** 28 dialog. Note: This dialog is accessible only when **Recording** method has been set to **Fast block** on the **Recording** 24 dialog.

This dialog is used to select the channels and sampling rate for fast recording.

Edit. To select a channel, highlight it and click the **Edit...** button. This will open the **Edit channel** dialog so that you can enter the details.
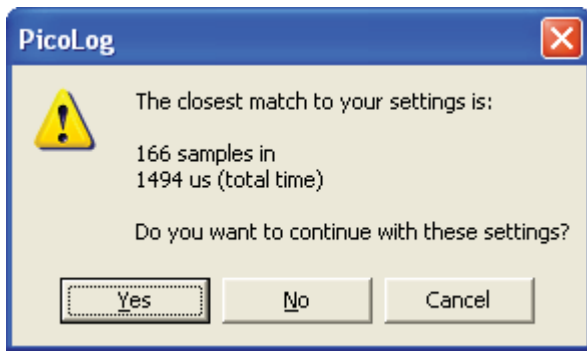
Number of samples. This specifies the preferred number of samples to be taken during a block.

Total time. This is the preferred time over which you want to collect the specified number of samples.

Sampling approximation. The ADC unit and the PC both have performance limits and will rarely be able to give exactly the settings that are requested. PicoLog will attempt to negotiate similar settings based on two user options:

- **Total time stays constant** - The time will remain very similar and the number of samples will be adjusted
- **Number of samples stays constant** - The number of samples will remain very similar and the time will be adjusted

When you click the **OK** button, the following dialog will appear to check whether the negotiated settings are acceptable (the dialog below does not represent the actual settings for this ADC):
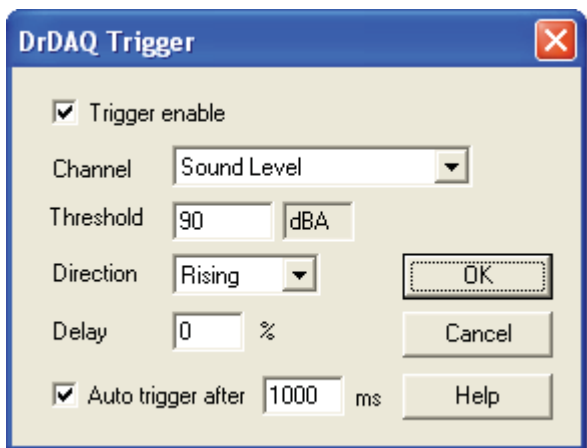

(Results will vary on different PCs and in different situations)
Disable. To disable a measurement in the list, highlight it and click **Disable**.

Trigger. To enter the trigger details for a measurement, highlight it and click the **Trigger** button. This will open the **DrDAQ Trigger** 92 dialog.

5.2.12.4   DrDAQ Trigger

Accessed via the **Trigger** button in the **DrDAQ block** 91 dialog.

Triggering is used to select the moment at which PicoLog starts collects data - usually at some fixed time before or after a trigger event.

A trigger event occurs when the specified channel crosses a voltage threshold - either rising or falling. PicoLog can start collecting data immediately after the trigger event, or a fixed time interval before or after the trigger event.

Trigger enable. If you wish to collect data only when the specified trigger conditions occur, check this box. If the box is not checked, data is displayed continuously.

Direction. The trigger direction can be either rising or falling. If rising is selected, the trigger event occurs when the voltage rises across the trigger threshold.

Channel. This selects which channel is to be used as the trigger input.

Threshold. This shows the voltage (in channel units) that the trigger channel must cross in order for a trigger event to occur.

Delay. This controls the time delay, as a percentage of the sweep time, between the trigger event and the start of collecting data. A negative delay means that the computer will show data that was recorded before the trigger event - for example, -50% places the trigger event in the middle of the collected data and -100% means that all data is collected before the trigger.

Auto trigger. If you wish PicoLog to trigger after a specified time - even if no trigger event occurs - check this box. This will prevent PicoLog from waiting indefinitely for the event and locking up the computer.

Note: If you disable auto-trigger and the computer does lock up, you can press the F9 key to simulate a trigger.

Auto trigger after. The time after which PicoLog will trigger, even if no trigger event occurs.

5.2.12.5   Device status

Accessed via the **Status** button in the **Converter details** 28 dialog.
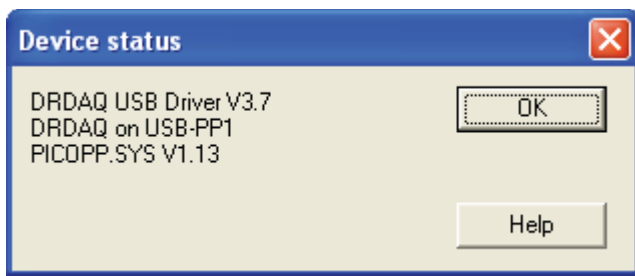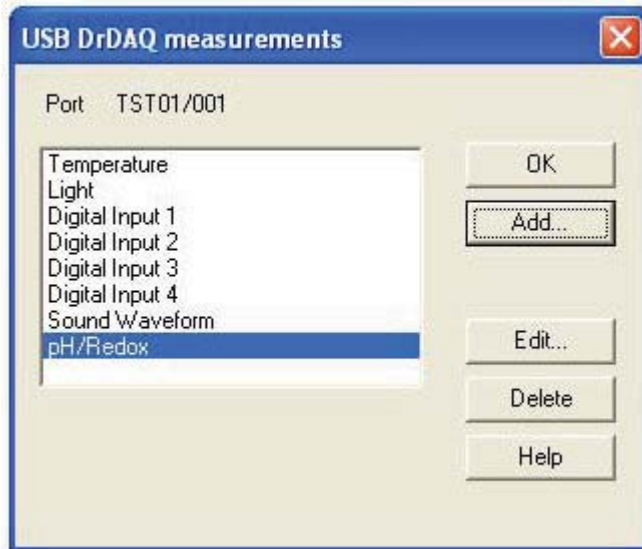

This dialog displays details of the ADC status.

5.2.13   USB DrDAQ

5.2.13.1   USB DrDAQ measurements

To access this dialog, assuming you have already set up PicoLog with a USBDrDAQ unit, select **Input channels...** from the **Settings** 22 menu.

This dialog is used to build up a list of measurements to measure for a converter. On the left is the current list of measurements and on the right are buttons to update the list.
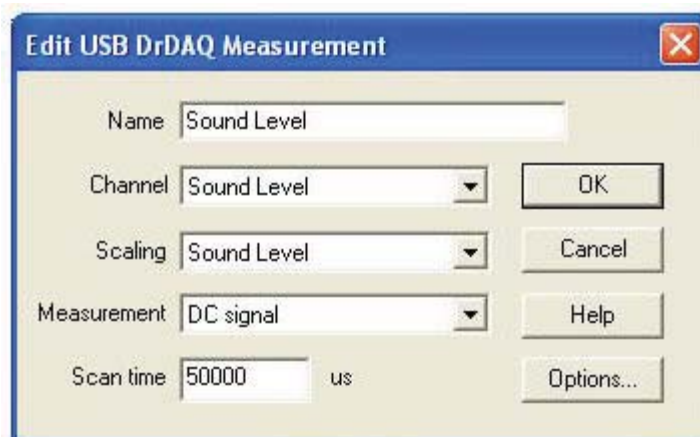
Add. To add a measurement to the list, click the **Add...** button. This will open the a dialog to enter details of the new measurement.

Edit. To edit a measurement in the list, highlight it and click the **Edit...** button. This will open the **Edit USBDrDAQ Measurement** 90 dialog so that you can edit the details.

Delete. To delete a measurement in the list, highlight it and click **Delete**.

5.2.13.2   Edit USB DrDAQ Measurement

Accessed via the **Edit** button in the **USBDrDAQ measurements** 94 dialog.

This dialog is used to enter the details for a measurement.

Name. This is the name of the measurement. It will appear on all reports.

Channel. This is the channel to be used for the measurement.

Scaling. For some sensors, more than one scaling is available. If so, this option is used to select the scaling that you wish to use.

Measurement. This specifies the type of measurement that will be made. The options are:

- **DC signal** - the DC component or average input signal.
- **AC signal** - the RMS AC signal (note that this excludes any DC component).
- **Frequency** - the frequency of the AC component, in hertz.

Note: **AC signal** and **Frequency** are not available for slowly changing channels

Scan time. PicoLog takes a set of readings at high speed and then uses these readings to calculate the selected measurement (**DC signal**, **AC signal** or **Frequency**). The scan time is the total time to take the set of readings for this measurement.
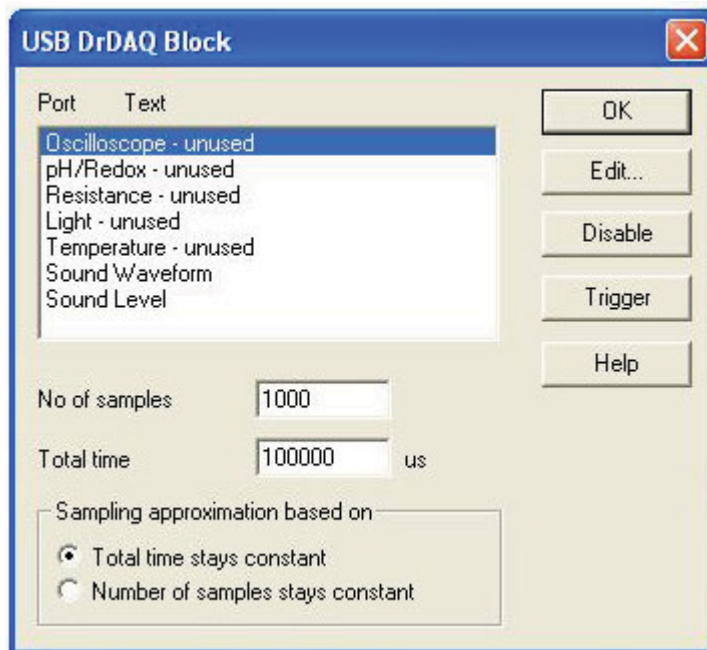
When making **DC signal** measurements, a longer scan time will reduce the effects of noise. Note, however, that the sum of the scan times for all channels must not exceed the sampling interval used for recording.

When making **AC signal** or **Frequency** measurements, the scan time should be at least three cycles at the minimum frequency that you wish to measure. For example, if you wish to measure a 50 Hz AC signal, one cycle is 20 ms, and three cycles are 60 ms.

Options. To set the options for the measurement (such as units and scaling) click **Options**. This will open the **Parameter options** 34 dialog.

5.2.13.3   USB DrDAQ block

Accessed via the **OK** button in the **Converter details** 28 dialog. Note: This dialog is accessible only when **Recording** method has been set to **Fast block** on the **Recording** 24 dialog.

This dialog is used to select the channels and sampling rate for fast recording.

Edit. To select a channel, highlight it and click the **Edit...** button. This will open the **Edit channel** dialog so that you can enter the details.

Number of samples. This specifies the preferred number of samples to be taken during a block.

Total time. This is the preferred time over which you want to collect the specified number of samples.

Sampling approximation. The ADC unit and the PC both have performance limits and will rarely be able to give exactly the settings that are requested. PicoLog will attempt to negotiate similar settings based on two user options:

- **Total time stays constant** - The time will remain very similar and the number of samples will be adjusted
- **Number of samples stays constant** - The number of samples will remain very similar and the time will be adjusted

Disable. To disable a measurement in the list, highlight it and click **Disable**.

Trigger. To enter the trigger details for a measurement, highlight it and click the **Trigger** button. This will open the **USBDrDAQ Trigger** 92 dialog.

5.2.13.4   USB DrDAQ Trigger

Accessed via the **Trigger** button in the **USBDrDAQ block** 96 dialog.
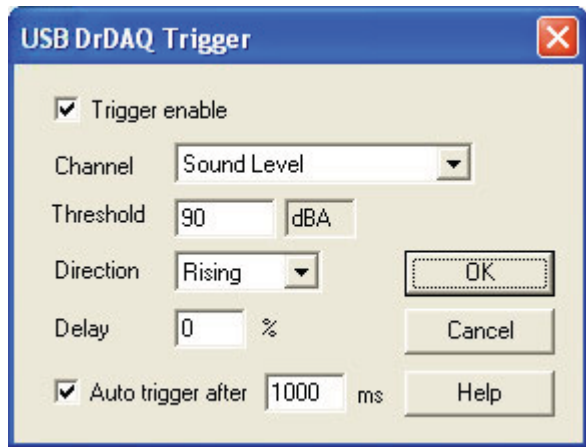
Triggering is used to select the moment at which PicoLog starts collects data - usually at some fixed time before or after a trigger event.

A trigger event occurs when the specified channel crosses a voltage threshold - either rising or falling. PicoLog can start collecting data immediately after the trigger event, or a fixed time interval before or after the trigger event.

Trigger enable. If you wish to collect data only when the specified trigger conditions occur, check this box. If the box is not checked, data is displayed continuously.

Channel. This selects which channel is to be used as the trigger input.

Threshold. This shows the voltage (in channel units) that the trigger channel must cross in order for a trigger event to occur.

Direction. The trigger direction can be either rising or falling. If rising is selected, the trigger event occurs when the voltage rises across the trigger threshold.

Delay. This controls the time delay, as a percentage of the sweep time, between the trigger event and the start of collecting data. A negative delay means that the computer will show data that was recorded before the trigger event - for example, -50% places the trigger event in the middle of the collected data and -100% means that all data is collected before the trigger.

Auto trigger after.   If you wish PicoLog to trigger after a specified time - even if no trigger event occurs - check this box and enter a number. This is the time after which PicoLog will trigger even if no trigger event occurs. Auto trigger prevents PicoLog from waiting indefinitely for the event and locking up the computer.

Note: If you disable auto-trigger and the computer does lock up, you can press the F9 key to simulate a trigger.

5.2.13.5   USB DrDAQ Device status

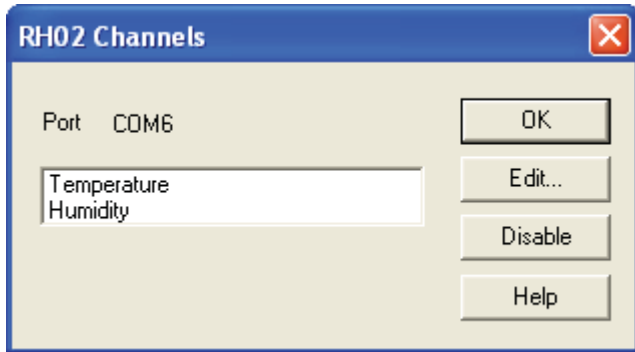Accessed via the **Status** button in the **Converter details** 28 dialog.
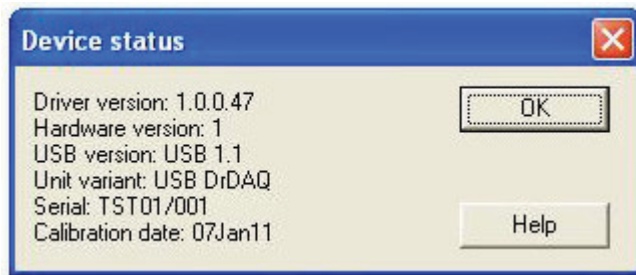
This dialog displays details of the ADC status.

5.2.14 RH-02

5.2.14.1 RH-02 Channels

To access this dialog, assuming you have already set up PicoLog with an RH-02 unit, select **Input channels...** from the **Settings** ⌐22⌐ menu.
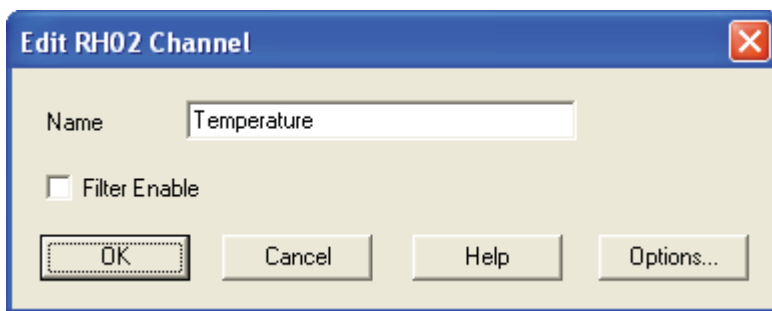

This dialog is used to select the channels that will be used to take measurements.

Edit. To select a channel, first highlight it, then click the **Edit...** button. This will open the **Edit RH02 Channel** ⌐99⌐ dialog so that you can enter the details.

Disable. To disable a previously selected channel, highlight it and then click **Disable**.

5.2.14.2 Edit RH-02 Channel

Accessed via the **Edit** button in the **RH02 Channels** ⌐99⌐ dialog.

This dialog is used to enter the details for a channel.

Name. This is the name of the channel. This name will appear on all reports.

Filter enable. If you want to use a filter to reduce the effects of electrical noise, check this box.

Options. To set the options for a parameter ⌐34⌐, click the **Options...** button.

5.2.14.3   Device status

Accessed via the **Status** button in the **Converter details** 28 dialog.
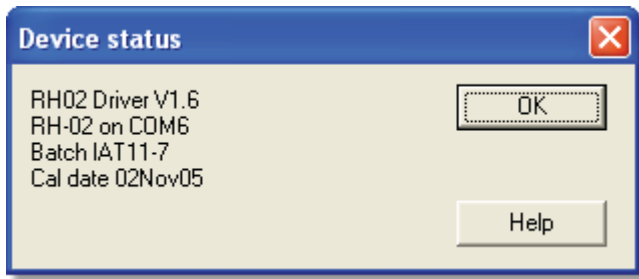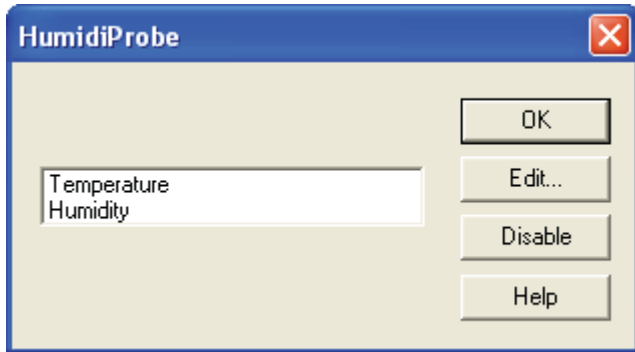

This dialog displays details of the ADC status.

5.2.15   HumidiProbe

5.2.15.1   HumidiProbe Channels

You should have previously set up PicoLog with a HumidiProbe unit. To access this
dialog, select **Input channels...** from the **Settings**| 22⌐ menu.

This dialog is used to select the channels that will be used to take measurements.

Edit. To select a channel, first highlight it, then click the **Edit...** button. This will open
the **Edit HumidiProbe Channel**| 101⌐ dialog so that you can enter the details.

Disable. To disable a previously selected channel, highlight it and then click **Disable**.

5.2.15.2   Edit HumidiProbe Channel

Accessed via the **Edit** button in the **HumidiProbe Channels**| 101⌐ dialog.
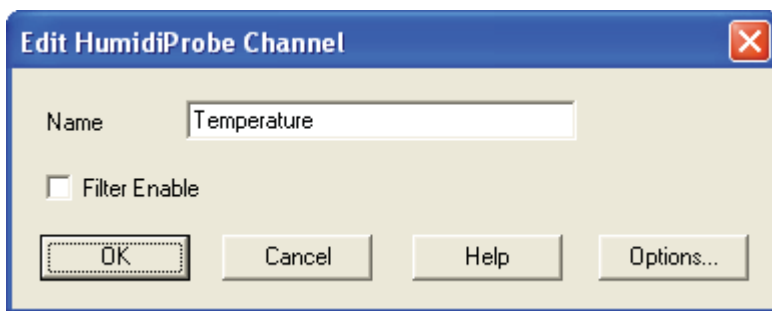
This dialog is used to enter the details for a channel.

Name. This is the name of the channel. This name will appear on all reports.

Filter enable. If you want to use a filter to reduce the effects of electrical noise, check
this box.

Options. To set the options for a parameter| 34⌐, click the **Options...** button.

5.2.15.3   Device status

Accessed via the **Status** button in the **Converter details** [28] dialog.
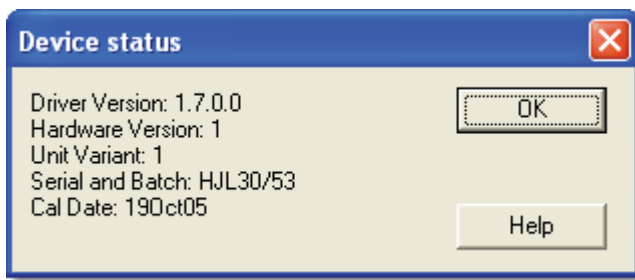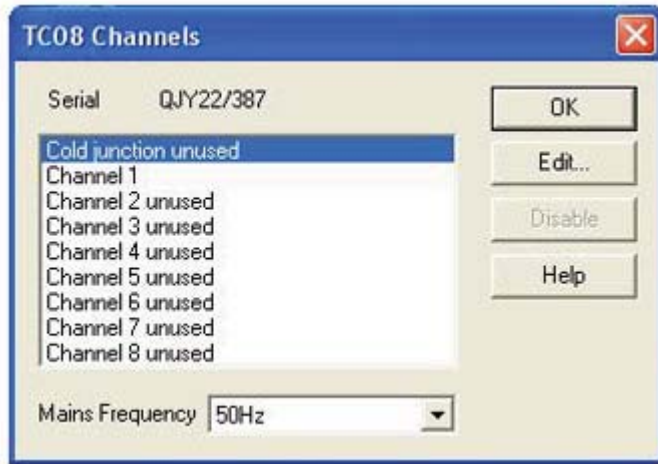

This dialog displays details of the HumidiProbe's status.

5.2.16   USB TC-08

5.2.16.1   USB TC-08 Channels

To access this dialog, assuming you have already set up PicoLog with a USB TC-08 unit, select **Input channels...** from the **Settings** 22 menu.

This dialog is used to select the channels that will be used to take measurements.

Edit. To select a channel, first highlight it, then click the **Edit...** button (or double-click with the mouse). This will open the **Edit TC08 Channel** 104 dialog so that you can setup the channel.

Disable. To disable a previously selected channel, highlight it in the list window and click **Disable**.

Mains Frequency. The USB TC-08 can filter out the noise associated with mains. Select the option corresponding to the frequency of mains in your country.

5.2.16.2   Edit USB TC-08 Channel

Accessed via the **Edit** button in the **TC08 Channels** [103] dialog.
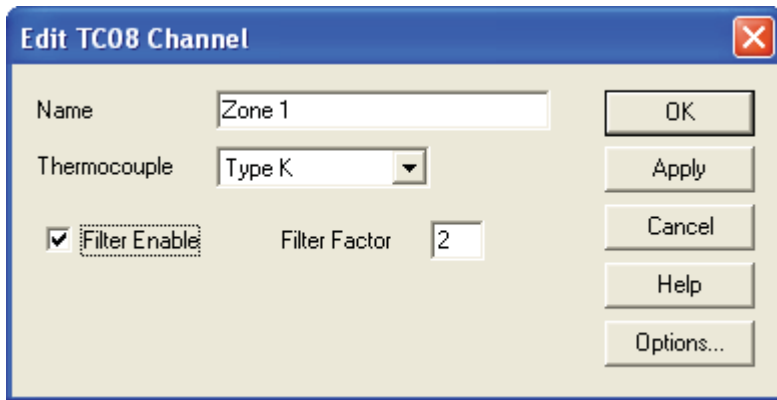
This dialog is used to enter the details for a channel.

Name. This is the name of the channel. This name will appear on all reports.

Thermocouple. This is the thermocouple type connected to the channel. There are eight valid thermocouple types: B, E, J, K, R, S, T, and N. There is also a ±78.125 millivolt range.

Filter enable. If you want to use a filter to reduce the effects of electrical noise, check this box.

Filter factor. A median filter is applied when 'filter factor' number of samples have been collected, returning the middle value. Filtered values are more stable, but respond more slowly to real changes in temperature. The higher the factor, the stronger the filtering effect will be.

Options. To set the options for a parameter [34], click **Options...**

5.2.16.3   Device status

Accessed via the **Status** button in the **Converter details** [28] dialog.
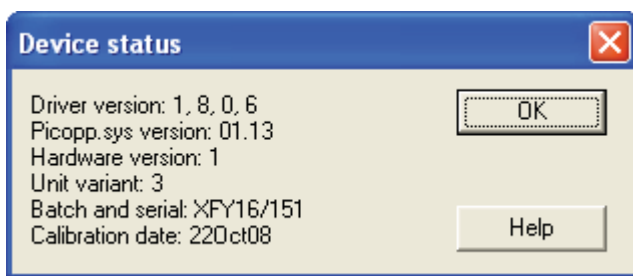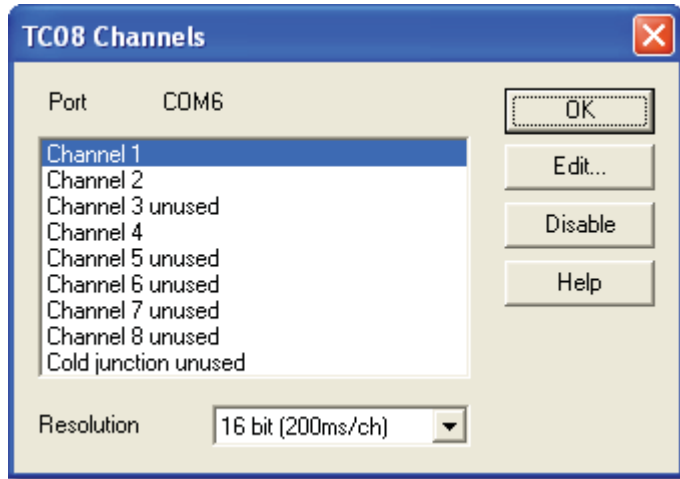

This dialog displays details of the ADC status. The calibration date will help you keep track of when the unit should be returned to Pico for optional annual recalibration.

5.2.17   Serial TC-08

5.2.17.1   TC-08 Channels

To access this dialog, assuming you have already set up PicoLog with a TC-08 unit, select **Input channels...** from the **Settings** 22 menu.

This dialog is used to select the channels that will be used to take measurements.

Edit. To select a channel, first highlight it, then click the **Edit...** button (or double-click with the mouse). This will open the **Edit TC08 Channel** 105 dialog so that you can setup the channel.

Disable. To disable a previously selected channel, highlight it in the list window and click **Disable**.

Resolution. The Serial TC-08 can run at a range of resolutions, and will run faster at lower resolutions.

5.2.17.2   Edit TC-08 Channel

Accessed via the **Edit** button in the **TC08 Channels** 105 dialog.
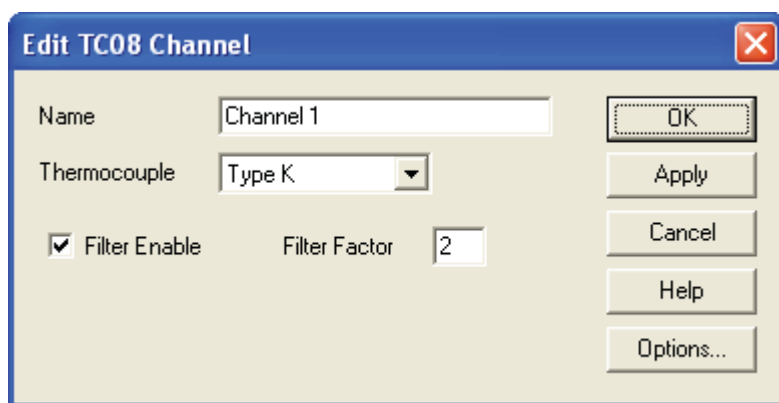
This dialog is used to enter the details for a channel.

Name. This is the name of the channel. This name will appear on all reports.

Thermocouple. This is the thermocouple type connected to the channel. There are eight valid thermocouple types: B, E, J, K, R, S, T, and N. There is also a ±60 millivolt range.

Filter enable. If you want to use a filter to reduce the effects of electrical noise, check this box.

Filter factor. A median filter is applied when 'filter factor' number of samples have been collected, returning the middle value. Filtered values are more stable, but respond more slowly to real changes in temperature. The higher the factor, the stronger the filtering effect will be.

Options. To set the <u>options for a parameter</u> 34, click this button.

5.2.17.3   Device status

Accessed via the **Status** button in the **Converter details** 28 dialog.
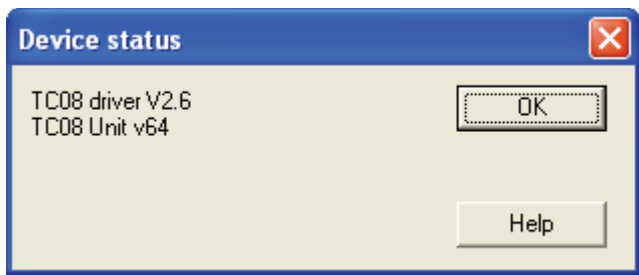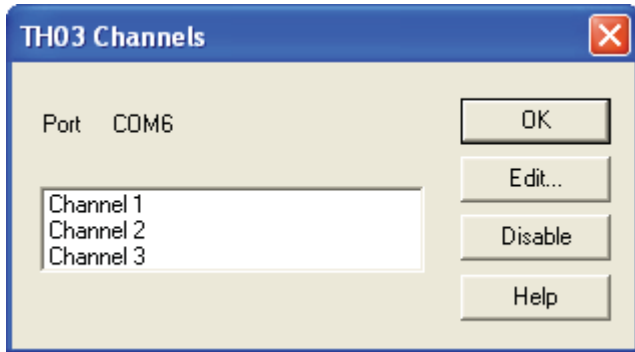

This dialog displays details of the ADC status.

5.2.18   TH-03

5.2.18.1   TH-03 Channels

To access this dialog, assuming you have already set up PicoLog with a TH-03 unit, select **Input channels...** from the **Settings** 22 menu.


This dialog is used to select the channels that will be used to take measurements.

Edit. To select a channel, first highlight it, then click the **Edit...** button. This will open the **Edit TH03 Channel** 107 dialog so that you can enter the details.

Disable. To disable a previously selected channel, highlight it and then click the **Disable** button.

5.2.18.2   Edit TH-03 Channel

Accessed via the **Edit** button in the **TH03 Channels** 107 dialog.
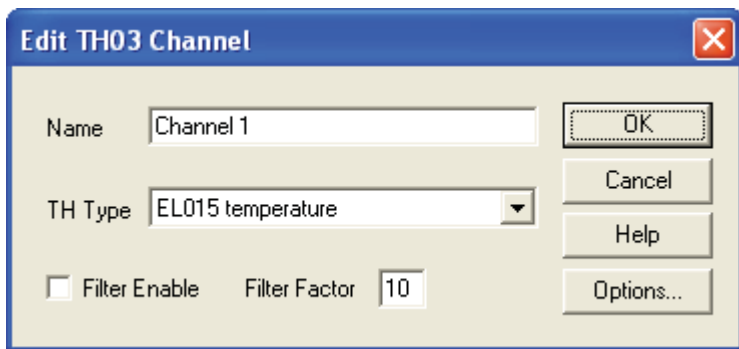
This dialog is used to enter the details for a channel.

Name. This is the name of the channel. This name will appear on all reports.

Sensor type. This is the sensor connected to the channel. There are seven choices:

- **EL015 (low temp)** is a thermistor sensor suitable for measuring temperatures in the range -30 to 70°C.
- **EL029 door switch** is a magnetic sensor, which senses if a door is open or closed.
- **EL031 light** is a sensor suitable for measuring light intensity.
- **EL039 (low temp)** is a thermistor sensor suitable for measuring temperatures in the range -40 to 30°C.
- **Medium temp** is a thermistor sensor suitable for measuring temperatures in the range 0 to 70°C.
- **High temp** is a thermistor sensor suitable for measuring temperatures in the range 0 to 300°C.
- **Unicam** is reserved for special uses

Filter enable. If you want to use a filter to reduce the effects of electrical noise, check this box.

Filter factor. Each time a reading is taken, the filtered value is updated using the equation:
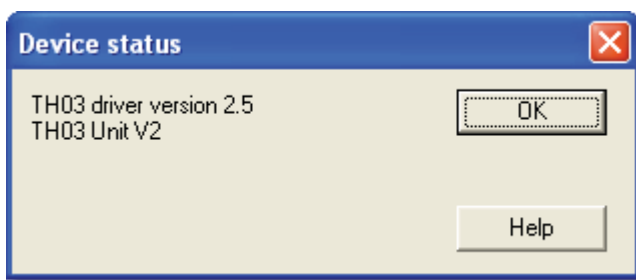
```
new value = old value + (reading - old value) / (filter factor)
```

Filtered values are more stable, but respond more slowly to real changes in temperature. The higher the factor, the stronger the filtering effect will be.

Options. To set the <u>options for a parameter</u> 34, click the **Options...** button.

5.2.18.3   Device status

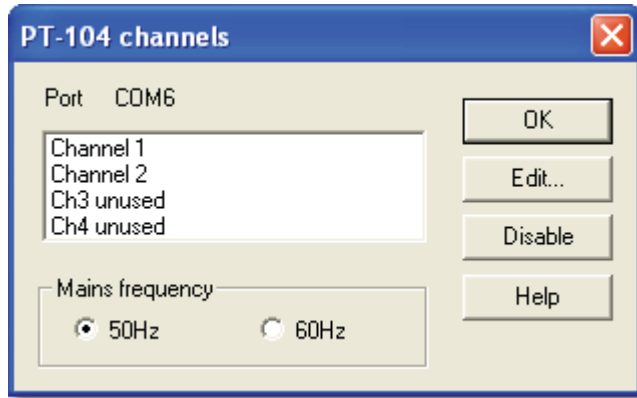Accessed via the **Status** button in the **Converter details** 28 dialog.

This dialog displays details of the ADC status.

5.2.19 PT-104 (Serial and USB)

5.2.19.1 PT-104 channels

To access this dialog, assuming you have already set up PicoLog with a PT-104 unit, select **Input channels...** from the **Settings** 22 menu.

This dialog is used to select the channels that will be used to take measurements.

Edit. To select a channel, first highlight it, then click the **Edit...** button. This will open the **Edit PT-104 Channel** 109 dialog so that you can enter the details.

Disable. To disable a previously selected channel, highlight it and then click the **Disable** button.

Mains Frequency. Select the mains frequency according to your location.

5.2.19.2 Edit PT-104 Channel

Accessed via the **Edit** button in the **PT-104 channels** 109 dialog.

This dialog is used to enter the details for a channel.

**Name.** This is the name of the channel. This name will appear on all reports.

Data type / Circuit. Select the appropriate settings for the sensor you are using.

Filter enable. If you want to use a filter to reduce the effects of electrical noise, check this box.

Options. To set the options for a parameter 34, click the **Options...** button.

5.2.19.3 Device status

Accessed via the **Status** button in the **Converter details** 28 dialog.
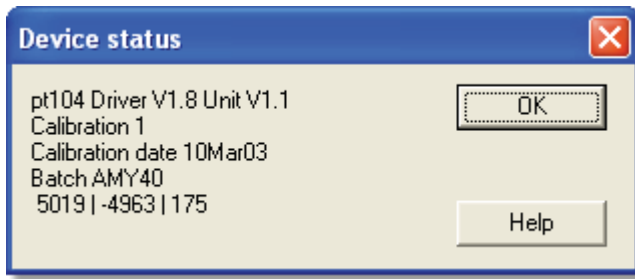
This dialog displays details of the converter status.

6   Equipment overview

PicoLog takes measurements using one or more converters. These devices connect to the serial or parallel port on your computer and convert electrical signals into measurements.

PicoLog can work with up to 20 converters at the same time in real time recording 24 mode but with only one converter in fast block or streaming mode.

6.1   ADC-10/12/40/42

These units plug into the parallel port and provide a single analogue input. The following table shows their differences:

Converter	Resolution	Range
ADC-10	8 bits	0 to 5 V
ADC-12	12 bits	0 to 5 V
ADC-40	8 bits	-5 to +5 V
ADC-42	12 bits	-5 to +5 V

- Both real-time and block modes are supported.
- You can connect these units to signal conditioners using a CM001 signal conditioner adapter.
- You can connect up to three units to the same computer.

6.2   ADC-11/22

The ADC-11 and ADC-22 are 10-bit converters with an input range of 0 to 2.5 V. The ADC-11 has 11 input channels and the ADC-22 has 22 channels.

There is no provision for connection to signal conditioners as these devices are unipolar. It would be possible to use these devices with signal conditioners that do not produce negative voltages.

- Both realtime and block modes are supported.
- You can connect up to three units to the same computer.

6.3   ADC-16

The ADC-16 is high-resolution converter that offers eight analogue input channels.

- You can use the CM002 signal conditioner adapter to connect up to four signal conditioner modules.
- The conversion time for the ADC-16 is over a second, so block mode is not supported.
- You can connect up to nine ADC-16 units to the same computer.

6.4   ADC-20/ADC-24

The ADC-20 and ADC-24 are high-resolution USB data loggers with multiple input ranges up to +/- 2.5 V. The ADC-20 has 8 analog input channels and the ADC-24 has 16 channels. The analog channels can be joined in pairs to operate as differential inputs. The ADC-24 also has four digital input/output channels.

- Both real-time and streaming 24 modes are supported.
- You can connect up to four units to the same computer.

6.5   ADC-100/101

The ADC-100 and ADC-101 are two-channel high-speed devices with programmable input voltage ranges. The ADC-101 has higher voltage ranges and differential inputs.

- Both real-time and block modes are supported.
- You can connect these units to signal conditioners using a CM001 signal conditioner adapter.
- You can connect up to three units to the same computer.

6.6   ADC-200

The ADC-200/212/216 devices have two inputs and programmable voltage input ranges. All devices collect samples at precise time intervals to an internal buffer.

- Both realtime and block modes are supported.
- You can connect these units to signal conditioners using a CM001 signal conditioner adapter.
- You can connect up to three units to the same computer.

6.7   PicoLog CM3

The PicoLog CM3 is a three-channel, high-resolution current data logger for monitoring current on up to three channels. With high accuracy and low noise, the PicoLog CM3 is ideal for recording data from three-phase supplies. The USB and Ethernet interfaces allow the logger to be used as a USB-only device, as a USB-powered device with Ethernet interface, or as a Power-over-Ethernet (PoE) device. Using the Ethernet interface, the PicoLog CM3 can be located anywhere on a LAN or on the internet.

This device operates in the following mode:

- **Real time continuous mode.** The unit collects data as fast as possible, computes a smoothed signal, and then transmits data at a slower rate to the PC. This mode results in the fastest screen updates but is limited in speed to several milliseconds between samples.

You can connect up to twenty units to the same PC.

6.8   PicoLog 1000 Series

The PicoLog 1000 Series PC Oscilloscopes have 12 to 16 input channels with a fixed voltage input range of 0 to +2.5 volts. All devices use the USB 2.0 interface at High Speed and also support operation with USB 1.1 ports and hubs.

The devices operate in any of the following modes:

- **Real time continuous mode.** The unit collects data as fast as possible, computes a smoothed signal, and then transmits data at a slower rate to the PC. This mode results in the fastest screen updates but is limited in speed to several milliseconds between samples.

- **Streaming mode.** The unit collects and downloads data continuously with a guaranteed sampling interval. For faster sampling, use block mode.

- **Block mode.** The unit collects data to an internal buffer at high speed, and then uploads the buffer contents to the PC as a block. This mode allows the fastest sampling rates, but the data collected has gaps caused by the dead time between blocks.

You can connect up to four units to the same PC.

6.9 PicoScope 2000 Series

The PicoScope 2000 Series PC Oscilloscopes have two input channels with a number of selectable voltage input ranges. All devices use the USB 2.0 interface at High Speed and also support operation with USB 1.1 ports and hubs.

The devices operate in any of the following modes:

- **Real time continuous mode.** The unit collects data at medium speed and transmits to the PC one sample at a time. This mode results in the fastest screen updates but is limited in speed to several milliseconds between samples.

- **Streaming mode.** The unit collects and downloads data continuously with a guaranteed sampling interval. For faster sampling, use block mode.

- **Block mode.** The unit collects data at high speed to an internal buffer, then downloads to the PC in one operation. This mode allows the fastest sampling rates but cannot collect data continuously.

You can connect up to four units to the same PC.

6.10 PicoScope 3000 Series

The PicoScope 3000 Series PC Oscilloscopes have two or more input channels with a number of selectable voltage input ranges. All devices use the USB 2.0 interface at High Speed and also support operation with USB 1.1 ports and hubs.

The devices operate in any of the following modes:

- **Real time continuous mode.** The unit collects data at medium speed and transmits to the PC one sample at a time. This mode results in the fastest screen updates but is limited in speed to several milliseconds between samples.

- **Streaming mode.** The unit collects and downloads data continuously with a guaranteed sampling interval. For fastest sampling, use block mode.

- **Block mode.** The unit collects data at high speed to an internal buffer, then downloads to the PC in one operation. This mode allows the fastest sampling rates but cannot collect data continuously.

You can connect up to four units to the same PC.

6.11 Demo

You can use the demo device to evaluate the functions available in PicoLog before you buy a Pico product. The device produces two channels of simulated data.

6.12 DrDAQ

DrDAQ is a medium-speed analog-to-digital converter with nine channels. The channels are as follows:

Channel	Connector	Range
Sound waveform	built in	±100
Sound level	built in	55 to 100 dBA
Voltage	Screw terminal	0 to 5 V
Resistance	Screw terminal	0 to 1 MΩ
pH	BNC	0 to 14
Light	Built in	0 to 100
Temperature	Built in	0°C to 70°C
External 1	FCC68 4-pin	automatic
External 2	FCC68 4-pin	automatic

The external sensor inputs automatically detect the type of sensor and scale the input accordingly.

DrDAQ has two outputs: a digital output and an LED. These outputs can be turned on permanently, only during recording or only when an alarm condition exists.

Note: DrDAQ can capture 15k samples per second, but we recommend using PicoScope for sample rates of 1 millisecond or faster. DrDAQ is intended for educational use, so to simplify usage, block mode is not available.

6.13   USB DrDAQ

USB DrDAQ is a medium-speed analog-to-digital converter with 17 channels. The channels are as follows:

Channel	Connector	Signal Type	Range
*Sound waveform	Built in	Input	±100
Sound level	Built in	Input	55 to 100 dBA
Temperature	Built in	Input	-10 to 70 °C
Light	Built in	Input	0 to 100
RGB LED	Built in	Output	16.7 million color
pH sensor Redox/ORP (Oxidation/ Reduction)	BNC connector BNC connector	Input	0 to 14 pH ±2 V @10^{12} Ω
Resistance 1	Screw terminal	Input	0 to 1 M Ω
Voltage	BNC connector	Input	± 10 V 100 kHz bandwidth
Ground	Screw terminal	Ground	Ground
Digital 1	Screw terminal	I/O	3.3 V out, 5 V in
Digital 2	Screw terminal	I/O	3.3 V out, 5 V in
Digital 3	Screw terminal	I/O	3.3 V out, 5 V in
Digital 4	Screw terminal	I/O	3.3 V out, 5 V in
External 1	FCC68 4-pin connector	Input	0 - 2.5 V -10 to 105 °C. 20-90% RH (non-condensing)
External 2	FCC68 4-pin connector	Input	As Ext. 1
External 3	FCC68 4-pin connector	Input	As Ext. 1
Signal generator	BNC connector	Output DAC	0 - 100 kHz ±1.5 V signal. ±1.5 V offset.

*For capturing sound waveforms, or for capture rates of 1 millisecond or faster, we recommend the use of PicoScope 6 (or higher) for better high frequency detail.

The external sensor inputs automatically detect the type of sensor and scale the input accordingly.

USB DrDAQ has four digital outputs, an LED, and a signal generator. The digital outputs and the LED can be turned on permanently, only during recording or only when an alarm condition exists.

The USB DrDAQ supports the following modes:

🔵 Real time continuous mode. The unit collects data as fast as possible, computes a smoothed signal, and then transmits data at a slower rate to the PC. This mode results in the fastest screen updates but is limited in speed to several milliseconds between samples.

🔵 Streaming mode. The unit collects and downloads data continuously with a guaranteed sampling interval. For faster sampling, use block mode.

Block mode. The unit collects data to an internal buffer at high speed, and then uploads the buffer contents to the PC as a block. This mode allows the fastest sampling rates, but the data collected has gaps caused by the dead time between blocks.

6.14   RH-02

The RH-02 connects to the serial port on your computer and measures temperature and humidity. Even if only humidity is required, both types of measurement must be taken.

- You can connect up to nine RH-02 units to the same computer.
- The conversion time for the RH-02 is over a second, so block mode is not supported.

6.15   HumidiProbe

The HumidiProbe connects to the USB port on your computer and measures temperature and humidity. Even if only humidity is required, both types of measurement are always taken.

- You can connect up to four HumidiProbe units to the same PC.
- The conversion time for the HumidiProbe is two seconds, so block mode is not supported.

6.16   PT-104 (Serial and USB)

The PT-104 temperature data loggers work with PT100 sensors, and can also be used to measure voltages up to 2500 mV and resistances up to 375 Ω. The conversion time for the PT-104 is 720 ms for full accuracy.

- USB/Ethernet connections allow various connectivity options such as: USB-only, USB-powered with Ethernet data, and Ethernet data with Power-over-Ethernet (PoE).
- Each PT-104 unit provides four inputs.
- You can use 2, 3 or 4-wire sensors.
- You can connect up to 20 PT-104 units to the same computer, if it has enough ports.

6.17   USB TC-08

The USB TC-08 works with thermocouples of any standard type, and you can also use any combination of channels to measure a voltage range of ±70 mV. The thermocouples are cold-junction compensated (the cold junction temperature can be monitored as an extra channel in PicoLog).

- You can connect up to 20 converters to PicoLog simultaneously. These can all be USB TC-08s for a maximum of 160 thermocouple channels.

6.18   Serial TC-08

The Serial TC-08 works with thermocouples of any standard type, and can also be used to measure voltages up to 60 mV. The conversion time for the TC-08 is over a second, so block mode is not supported.

- Each TC-08 unit provides eight inputs.
- You can connect up to nine TC-08 units to the same computer.

6.19 TH-03

The TH-03 is designed to measure temperatures. It can also be used to provide a qualitative measure of light level and to monitor a switch (e.g. a door switch). The conversion time for the TH-03 is over a second, so block mode is not available.

- Each TH-03 unit provides three inputs.
- You can connect up to nine TH-03 units to the same computer.

6.20 IP sockets

PicoLog has built-in support for transferring data over an IP network.

One computer supplies the data and is referred to as the server. The other computer (referred to as the client) receives data from the server and displays the measurements as if they were collected locally. A server can support any number of clients and a client can get data from up to 10 servers.

A client needs two pieces of information to talk to a server: the name of the server and a socket number (normally 1050). The server does not need to know anything about the client.

The link uses the UDP/IP protocol. This is very efficient but does not guarantee that every message will get through. On large networks, a lost message would result in a delayed data update on the client.

See the Transfer data over an IP network 19 section for detailed instructions on setting up a link.

6.21 Signal conditioners

The Pico range of signal conditioners provide a quick and easy way of connecting sensors to Pico Converters. PicoLog has built-in scaling to use the signal conditioners with a wide range of sensors. To enable signal conditioner scaling for a measurement:

1. On the measurement dialog, click the **Options** button

2. Click the **Conditioners** button

3. Select the signal conditioner type (the **Sensors** dialog will be updated to show the selection of sensors that work with this signal conditioner)

4. Select the sensor type

For more information about signal conditioners, and about the `.psc` files that contain details about them, please consult the signal conditioner help file.

7   Technical information

7.1   .ini preferences file

The preference file, `plw.ini`, contains two sections: `[General]` and
`[Preferences]`. These sections contain the following items:

```
[General]
DataPath              Alternate path for data files.
UserName              Text to display in the footer for printed reports
Language              Language code
Serial                Serial number for PicoLog
VersionWarning        Version warning state (tells to check web for update)
[Preferences]
Colour0                (0 to 16) Colour of a graph component in COLORREF
                      format (see Colours [43] dialog)
CustomColour0         (0 to 15) Custom colors used by the standard Windows
                      colour selection dialog in COLORREF format (see Colours [43]
                      dialog)
BeepOnReading         Sound options (see Sounds [43] dialog)
BeepOnLamp
BeepOnAlarm
Fahrenheit            See Temperatures [44] dialog (Yes = Fahrenheit, No =
                      Celsius)
QuickSampleMs         Minimum sample interval for which AC/frequency
                      measurement is possible (default is 1000 ms). Warning:
                      reducing this will significantly slow down the sampling
                      speed of some ADC units by preventing the Quick sample
                      mode from being active at sampling intervals up to 1000
                      ms.
AllowStandby          By default, PicoLog prevents a PC from automatically going
                      to the power-saving Standby mode. If AllowStandby=Yes
                      then PicoLog will not interfere with power saving
                      operations.
DemoMode              Use to override the installation setting for whether or not
                      PicoLog is in Demo mode. However, the product drivers
                      will need to be reinstalled if PicoLog was installed in Demo
                      mode (Yes = Demo, No = Normal).
```

7.2   .plw data file

The `.plw` file has a fixed-length header, followed by a data record for each sample. It is terminated by a copy of the `.pls` file that was used to record it.

The first two-byte field of the header contains the length, in bytes, of the header. The remaining fields are as follows:

UNS16	header_bytes;	Length, in bytes, of this header
char	signature[40];	"PicoLog for Windows"
UNS32	version;	
UNS32	no_of_parameters;	Number of parameters recorded
UNS16	parameters[250];	
UNS32	sample_no;	Same as `no_of_samples`, unless wraparound occurred
UNS32	no_of_samples;	Number of samples recorded so far
UNS32	max_samples;	
UNS32	interval;	Sample interval
UNS16	interval_units;	0=femtoseconds, 4=milliseconds, 5=seconds, 6=minutes, 7=hours
UNS32	trigger_sample;	
UNS16	triggered;	
UNS32	first_sample;	
UNS32	sample_bytes;	Length of each sample record
UNS32	settings_bytes;	Length of settings text after samples (copy of `.pls` file)
PICODATE	start_date;	
FULLTIME	start_time;	
long	minimum_time;	
long	maximum_time;	
char	notes[1000];	
long	current_time;	
unsigned short	stopAfter;	
unsigned short	maxTimeUnit;	
unsigned long	maxSampleTime;	
FULLTIME	startTimeMsAccuracy;	Time when sampling starts in real-time collection mode.
FULLTIME	previousTimeMsAccuracy;	Time when the last sample was taken in real-time mode.
unsigned long	noOfDays;	The number of days elapsed since sampling in real-time collection mode started.
UNS8	spare[58];	

Definition correct as of R5.23.0.

7.3 .pls settings file

PicoLog uses `recorder.pls` to hold information about the current recording session. A separate file, `player.pls`, holds information about the current player session.

The user can use the **Save as...** option in the **File** 21 menu to save the current settings in a named `.pls` file. These details can later be loaded to carry out a new test with the same settings.

The `recorder.pls` file is also written to the end of each `.plw` data file and is automatically reloaded when an old `.plw` file is loaded.

All settings files are in Windows `.ini` format and could be edited using a text editor, although this is not recommended. The file contains the following sections:

`[Sampling]`	This section contains details of recording and sampling.
`[General]`	Numbers of parameters, converters, etc
`[Converter 1]`	Generic converter details - type and port
`[Unit 1]`	Type-specific converter details
`[Unit 1 Measure 1]`	Details about a measurement from converter 1
`[Parameter 1]`	Information on the monitor window
`[Recorder]`	Information on the recorder window
`[Graph1]`	Information on the graph window
`[XYGraph1]`	Information on the XY graph window
`[Spread1]`	Information on the spreadsheet window
`[File]`	Current filename

7.4   Scaling file

This file is a text file containing information in the following format.

The first few lines define a number of keyword parameters. These lines are in the same format as a Windows `.ini` file, with a keyword, an equals sign and then a value, for example:

```
Units=°C
```

One of the keyword parameters is the scaling method and must always be included. The remaining parameters are optional. The keywords for the optional parameters are listed below.

After the optional parameters, the actual scaling information appears in the same format as it is entered in the scaling dialog.

The scaling method can be specified either in English or in the currently selected language. If the scaling method is specified in English, it will be understood regardless of what language is selected.

For a lookup table with just two pairs, the file would look like this:

```
Notes=LM35CZ Temperature sensor
Type=Table
Units=°C
-0.02    -20
 0.1     100
```

For an <u>equation</u> 124, the file would look like this:

```
Notes=Temperature in Fahrenheit from LM35CZ
Type=Equation
32 + x *0.005555
```

The optional parameters are:

- **Notes.** You can include one or more lines of notes to explain what this scaling file is to be used for. The first few lines of the scaling file are displayed when the file is loaded, so the notes give the user an indication that they have loaded the correct scaling file.

- **Units.** The unit text to be shown on graphs, spreadsheets etc

- **Width.** The field width when the parameter appears in spreadsheets

- **Places.** The number of decimal places to display

- **MinValue.** The minimum value for graphs

- **MaxValue.** The maximum value for graphs

Some of the optional parameters will automatically set the fields on the **Parameter options** dialog, for example the units, range etc. See the **Parameter options** 34 dialog for more information on these parameters

7.5 Signal conditioner file

PicoLog and other Pico software products are provided with a set of `.psc` files that contain scaling information on a wide range of sensors. The **Signal Conditioner** 27 dialog offers a choice of the sensors in these files.

Users can add their own scaling information by creating additional `.psc` files. These will be used automatically. It may, however, be easier to use the standard Parameter scaling 35 facilities of PicoLog.

See the Signal Conditioner help file for more information about these files.

7.6 Command line options

You can specify the following options when starting PicoLog for Windows:

`-p`	start PicoLog in player mode
`-r`	restart recording
`xxxx.pls`	load the settings from xxxx.pls

7.7 Multiple program instances

You can have more than one copy of PicoLog running at once. This means that you can use one copy to examine old data files whilst another copy is collecting a new data file. You can have more than one 'player' open to examine old files, but only one recorder is allowed.

To start PicoLog as a recorder, click the **Recorder** icon in the Pico Technology program group.

To start PicoLog as a player, you can either click the **Player** icon in the **Pico Technology** program group or, if you already have a recorder running, select the **Player** window from the **View** 22 menu.

See also the `-p` option for the startup command.

7.8 DDE

DDE stands for **Dynamic Data Exchange**. This is a convenient method of transferring the current set of readings to other applications. Data is updated continuously, about once per second.

Data items are identified by three keywords: **Application**, **Topic** and **Item**. The keywords accepted by PicoLog are:

```
Application     PLW

Topic           Current

Item            Name  - parameter name

                Value  - the current value

                Units  - the units

                Alarm  - the alarm status
```

Each DDE request returns a list of values for each parameter.

To read the current values into Excel, type the following command into a spreadsheet cell:

```
=PLW|Current!Value
```

To read the current values into Quattro Pro, type in the following command into a cell:

```
@DDELINK([PLW|Current]Value)
```

Most application programming languages (C, Delphi, Visual Basic) provide tools to make DDE requests from other applications.

7.9   Equation notation

An equation can contain the following items:

- 🔵 **Input parameters.** These are represented by X for a measured parameter and A, B, C, D, E for a calculated parameter.

- 🔵 **Numbers.** These should be in fixed point decimal notation, such as 12.34. Exponential notation, such as 1.234E1, is *not* supported.

- 🔵 **Mathematical operators.** See below.

- 🔵 **Mathematical functions.** See below

- 🔵 **Spaces.**

- 🔵 **Operators.** The operators follow the normal rules of operator precedence (brackets, then division and multiplication, then addition and subtraction). If you wish to force a particular order of evaluation, use brackets.

Notation	Description	Usage
( )	brackets	(x - 5) * 6
-	unary minus	-x
-	binary minus	x - 5
+	plus	x + 5
*	times	x * 5
/	divide	x / 5

- 🔵 **Functions**

Name	Description	Usage	Example
exp	e^x	exp (x)	exp (3) = 20.085
log10	log10	log10 (x)	log10(100) = 2
ln	loge	ln (x)	ln(20.085) = 3
power	power	x power 5	2 power 3 = 8
mod	modulo (remainder)	x mod 5	10 mod 2 = 1
sqrt	square root	sqrt (x)	sqrt(2) = 1.414

7.10   Glossary

.bmp

Bitmap file format, used for uncompressed images. The bitmap format is a very widely supported generic image format. The files are not usually compressed, and are therefore very large, but the image quality is very high.

.jpg

JPEG file format, used for compressed images such as photographs. The image format most widely supported across all platforms.

.pls

PicoLog settings file. This holds data about the setup of the current recording session, but does not hold data collected from the converter.

.plw

PicoLog data file. This file holds the data collected from the converter, and ends with a copy of the `.pls` PicoLog settings file.

.prn

The print file exported from the spreadsheet window is formatted with 'tab-separated values'. The data fields are separated by tabs and each record is separated with a carriage return, as in the following example:

```
Time (s)      Sound Level (dBA)
0             55.5
1             55.4
2             56.2
```

.scl

Pico scaling file. It contains data about a specific type of sensor. Some files such as `PT100.scl`, are installed with the application and can be loaded from the **Parameter scaling** 35 dialog while the **Use scaling from file** option is selected. The data can be used to calibrate the sensor, or to scale it to a particular measurement unit.

.wmf

Windows Metafile. PicoLog uses this vector-based format because it produces scalable images and has a small file size.

ADC

Analog to Digital Converter. Pico ADCs range from the single-channel ADC-10 to the 16-channel ADC-20. ADCs sample analog signals and convert them to digital data for storage and processing.

Client

The client computer requests and receives information from a server. Therefore when setting up an IP Network arrangement, the server is attached to the converter and passes data to the client, which then receives and records it.

COLORREF

C language `typedef` of `unsigned long` used by windows. For more information, search http://msdn.microsoft.com/library/.

Converter

See ADC.

IP socket

Internet Protocol socket. An IP socket simply defines the data transfer protocol and the socket via which the server and client communicate. The default socket number is 1050. Note: An IP socket is not a physical port.

Port

A physical connector, usually on the back of the computer, to which Pico converters are attached.

- USB - Units that natively support USB do not have port numbers
- Parallel - LPT1, LPT2, etc. (sometimes known as a printer port)
- Serial - COM1, COM2, etc.
- Parallel Port USB adapter - USB-PP1, USB-PP2, etc.

Server

Receives data requests from the client and returns data as a response. When you set up an IP Network, therefore, the server is attached to the converter and passes data to the client, which then receives and records it.

USB 1.1

Universal Serial Bus (Full Speed). It can support data transfer rates up to 12 Mbits per second. USB 1.1 was superseded by USB 2.0.

USB 2.0

Universal Serial Bus (High Speed). It can support data transfer rates up to 480 Mbits per second and is the successor to USB 1.1.

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