

PicoLog Data logging software

User's Guide

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Contents

1 Introduction		1
1 Online help		1
2 Overview		1
3 Recording		2
4 Types of measure	ment	2
5 Legal information		3
6 Safety warning		3
2 PicoLog components	S	4
1 Introduction		4
2 PLW Recorder		5
3 PLW Player		6
4 PLW Graph		7
5 PLW XY Graph		9
6 Spreadsheet		10
7 Notes		11
3 How to		12
1 Add new measure	ments	12
2 Select which meas	urements to display	12
3 Start a new run		12
4 Repeat an existing	run	13
5 Start recording wh	nenever Windows starts	13
6 Display data		13
7 Print data		14
8 Export data to a s	preadsheet	14
9 Export a graph to	a word processor	14
10 Enable date and	time scaling on a graph	15
11 Transfer data ov	er an IP network	16
12 Run multiple rec	orders	17
4 Menu bar		18
1 File		18
2 Settings		19
3 View		19
4 Help		20
5 Keyboard shortcu	ts	20
5 Dialogs		21
1 General dialogs		21
1 Recording		21
2 Sampling F	late	
3 Print 4 Confirm Fi	le delete	

	5 Signal Conditioner	 24
	6 Converter-related	 25
	7 IP socket-related	
	8 Parameter-related	 31
	9 Window-related	 37
	10 Preferences	 40
2 Har	dware configuration	 42
	1 ADC-10/12/40/42	 42
	2 ADC-11/22	 46
	3 ADC-16	
	4 ADC-20/ADC-24	
	5 ADC-100/101	
	6 ADC-200/212/216	 61
	7 PicoLog 1000 Series	 ده
	8 PicoScope 2000 Series	
	9 Picoscope 3000 Series	
	17 BH-02	
	13 HumidiProbe	 90
	14 USB TC-08	 92
	15 Serial TC-08	 94
	16 TH-03	 96
	17 PT104	
6 Equipme	ent overview	 100
1 4 D (-10/12/40/42	100
2 4 00	- 10/ 12/ 40/ 42 ······	100
	-11/22 ·····	100
		100
4 ADC		
5 ADC	C-100/101	
6 ADC	C-200	 101
7 Pico	Log 1000 Series	 101
8 Pico	Scope 2000 Series	 101
9 Pico	Scope 3000 Series	 102
10 De	mo	 102
11 Dr	ΔΟ	
12 01		102
12 KF		 103
1 3 H u	midiProbe	
14 PT	-104	103
15 US	В ТС-08	 103
16 Ser	ial TC-08	 103
17 TH	I-03	 104
19 ID	sockets	104
10 10	nal aanditianana	104
14 SIG		104
7 Technica	l information	105
1 .ini ı	oreferences file	 105
2 .plw	data file	 106
3 nla	settings file	107
	36 CUIT23 IIIC	

4 Scaling file	
5 Signal conditioner file	
6 Command line options	
7 Multiple program instances	
8 DDE	110
9 Equation notation	
10 Glossary	
- 	



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 2. 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 analyses measurement data. It has the following capabilities:

- Supports any Pico converter
- 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 33 for measurements you want to take
- Enables you to apply parameter scaling 32, using equations or tables
- Includes built-in scaling for any Pico Signal Conditioner 24
- Allows you to edit calculated parameters 36
- Can analyse other files during data collection
- Displays data during slow collection and after collection
- Scraphical display, if you activate the PLW XY Graph Swindow or PLW Graph window, and spreadsheet display if you activate the PLW Spreadsheet spreadsheet window
- Transfers data to other applications via clipboard, file or DDE 110
- Transfers data between computers using IP sockets 104

1.3 Recording

The recording mode and repeat functions are selected using the Recording and repeat functions are selected using the Recording along. 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).
- 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 DrDAO 102, 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 <u>OuickSampleMs</u> 1051.

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 311: range, unit and decimal place preferences
- Alarm settings 33
- Signal Conditioner 24 options
- Parameter scaling 32: scaling for other types of sensor, using table lookup or equations

2

1.5 Legal information

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1.6 Safety warning

Do not connect the ground input of the ADC 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 ADC 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 5. Enables you to start and stop recording and to specify recording files, the measurements currently being taken and the alarm state.

PLW Player 6. Enables you to scroll quickly and easily through stored files to compare results on successive runs.

PLW Graph 7. Shows the readings for single or multiple measurements over a period of time.

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

Spreadsheet 10. Shows detailed or summary information in a format which can be copied to a clipboard.

Notes 11. 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:

II, PLW R	ecorder			
File Settin	File Settings View Help			
Awaiting data filename Use File New data				
Alarm	Channel	Reading	Units	
\bigcirc	Battery level	1.4803	۷	
0	Sound level	23.77	dB	
\bigcirc	Pilot frequency	1140	Hz	

At the top is a menu bar containing the <u>File</u> [18], <u>Settings</u> [19], <u>View</u> [19] 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.

Pelp. 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 <u>Notes</u> 11 window.

View Graph. Open a PLW Graph 7 window.

■ View spreadsheet. Open a <u>Spreadsheet</u> 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:

🧿 ті

The measurement value is within range

- O 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:

<u>/</u>	
\sim	
囯	

View Notes. Open a Notes window.

View Graph. Open a <u>PLW Graph</u> window.

View spreadsheet. Open a <u>Spreadsheet</u> window.

2.4 PLW Graph

From the View 19 menu of PicoLog Recorder or Player, select Graph.



Note that there are several graph options 37 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:

- 44 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 guarter right. Move a guarter 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 34. Select the parameters, channels or measurements to display on the graph. You can display up to 20 parameters on a single graph.
- View options 37. 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 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, autoscaling 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 19 menu of PicoLog Recorder or Player, select Spreadsheet.

H. PLW Spr	eadsheet	
<u>⊒ •</u> ⊑ ✓	= .	*
Time		
Seconds	Channel 1 - Internal TypeK	Channel 2 - Simulator TypeK
0	21.38	99.98
5	21.31	100.00
10	21.40	100.04
15	21.40	100.07
20	21.34	100.01
25	21.38	100.07
30	21.46	100.12
35	21.47	100.08
40	21.52	100.06
45	21.44	100.03
50	21.36	99.99
55	21.35	99.99
		· · · · · · · · · · · · · · · · · · ·
		> .:

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 for one day:

- Point the mouse at any reading during the required day
- Click the left mouse button (this will highlight the reading)
- Click on the 'select day' icon:

2.7 Notes

From the View 19 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...

12

3.1 Add new measurements

If you are using a Pico signal conditioner, see Signal Conditioners 104.

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 50 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 32) 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 <u>Select</u> parameters 3 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 [21] method (real time continuous [2] or fast block [2]) not applicable on DrDAQ [102]
- Sampling Rate 22, including sampling interval and maximum number of samples
- Converter details 25
- Measurement setup. If you are using the ADC-11, for example, the computer will display the Edit ADC11 Measurement 46 dialog

Once you have entered these details, check that the monitor window in <u>PLW Recorder</u> $\lceil 5 \rceil$ 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 5 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: . Note: Do not attempt to save your data directly to a floppy disk. The computer will display the next sequence-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

Note: Do not attempt to save your data directly to a floppy disk.

- 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 12.

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



View Notes. Opens a <u>Notes</u> 11 window.

View Graph. Opens a <u>Graph</u> 7 window.

View spreadsheet. Opens a <u>Spreadsheet</u> 10 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: \Box

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, \square , then write the data to a text file. You can then import the text file into a spreadsheet.

Note: Do not attempt to save your data directly to a floppy disk.

If you wish to have the readings in the spreadsheet updated continuously with the current readings, you can use DDE [10].

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

Note: Do not attempt to save your data directly to a floppy disk.

Alternatively, you can click the New file button: Alternatively, you can click the New file button: Alternatively, you can 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 and dialog for more details.

3.11 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: 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

3.12 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> (this will take precedence, and inhibit other converters from recording during this period).

4 Menu bar

4.1 File



To access this menu, select File from the menu bar of PicoLog Recorder 5

New settings. Erases the current settings and then takes you, step by step, through the process of setting up PicoLog to collect some data.

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.

Note: Do not attempt to save your data directly to a floppy disk, as this would cause PicoLog to operate unacceptably slowly.

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	Colours 40 - enables you to select the colours that PicoLog will use.
Sound	
Temperature	Sound 41 opables you to select the sounds for cortain events
IP Sockets	Sound we - enables you to select the sounds for certain events.
Converter	
Recorder	Temperature 41 - enables you to select the units for temperature
	measurements.

<u>IP Sockets</u> activates the IP network facility, allowing you to transfer data between two computers running PicoLog.

<u>Converter</u> 27 - used to specify what converter is to be used.

Recorder 41 - used to specify whether the Re-record and Pause buttons are displayed in the Recorder window.

Exit. Exits from the program.

18

4.2 Settings

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



The settings menu appears on the menu bar at the top of the monitor window in PLW Recorder 5° .

Recording 21. Enables you to choose the recording method for your measurements.

Sampling....²² Enables you to specify the sampling rate and the action at the end of a run.

Input channels...²⁶ Enables you to specify the converter and port that will take the measurements.

<u>Calculated parameters</u> (35). 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 34. 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 5° or Player 6° .

Player	Alt+P
Notes	Alt+N
Spreadsheet	Alt+S
Graph	Alt+G
XY Graph	Alt+X

Player. Creates a new Player 6 window.

Notes. Creates a new Notes 11 window.

Spreadsheet. Creates a new <u>Spreadsheet</u> window.

Graph. Creates a new Graph 7 window.

XY Graph. Creates a new XY Graph Shindow.

4.4 Help

To access this menu, select Help from the menu bar of PicoLog Recorder 5.



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 <u>PLW Recoder</u> 5^h.

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 <u>Player View</u>
- Alt-N open Notes View 11
- Alt-S open Spreadsheet View 10
- Alt-G open Graph View 7
- Alt-X open XY Graph View 9
- F1 view <u>Help</u>²⁰ index

5 Dialogs

5.1 General dialogs

5.1.1 Recording

To access this dialog, open the <u>Settings</u> menu of PicoLog Recorder and select Recording.

Recording			
Recording method	Real time continuous		
Action at end of run	Stop 💌		
Restart delay	1 Minutes 💌		
Use multiple converters			
OK	Cancel Help		

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 1021.

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.
- 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 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 computer automatically increments a sequence number at the end of the filename.

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 <u>Settings</u> menu of PicoLog Recorder and select Sampling...

Sampling Rate	e		
Sampling interv	al 1	Seconds 💌	ОК
Stop after 🔎	500	Samples	Cancel
C	100 🔶	Seconds 💌	Help
Readings per sample As many as possible 💌			

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 \Box when one of the display windows is open.

Print		
Printer:	Brother HL-6050D/DN series	•
<u>N</u> o of Co	pies: 1	<u>S</u> etup
(OK	Cancel	<u>H</u> elp

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 18 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.

Confirm File delete	×
Delete: C:\PICO\example2.PLW	
OK Cancel Help	

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 and 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 <u>Parameter scaling</u> at 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 I nput channels... from the <u>Settings</u> menu.

Converter deta	ils		
Converter type	PicoLog1012/1216	•	ОК
Port		-	Cancel
USB Devices Device Picol og1216	Serial		Help
Hotograid	H2000/105		
			Status
USB enumeration	progress		
			Refresh

This dialog is used to specify the details for a converter. Note that it is NOT displayed if you set the <u>Converter preferences</u> 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 and dialog.

Port. Select the port to which the converter is connected if the attached Pico product 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)

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.

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 74 dialog). A double-click with the mouse on the desired USB device will also have the same effect.

5.1.6.2 Converters

To access this dialog, click the OK button in the <u>Converter details</u> and dialog. Note: If the Use multiple converters box is ticked in the <u>Recording</u> and dialog, selecting I nput channels... from the <u>Settings</u> menu will take you directly to the Converters dialog.

Converters	X
PicoLog1216 AQ005/139 TC-08 (USB) v3 XFY16/151	OK Add Edit Delete Parameters
	Help

This dialog is used to build up a list of <u>converters</u> 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 <u>Converter</u> details 25 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 <u>Preferences</u> submenu in the <u>File</u> menu and select Converter.

Converter preferences		
This dialog specifies the converter to use in single converter mode		
C Ask during configuration		
C Use converter specified during install		
Use conv	verter specified here	ОК
Converter	PicoScope 3000 Series 💌	Cancel
Port	-	Help

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 submenu in the File menu and select IP Sockets.

IP Socket options			
🔲 Server enabled			OK
🔲 Client enabled			Cancel
Server socket	1050		Help
Response timeout	1000	ms	
Minimise network traffic			

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 dialup 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 <u>Converter details</u> ²⁵ dialog.

Note: Only accessible when Client enabled has been checked in the <u>LP_Socket</u> options 28 dialog and the Converter type has been set to Socket in the <u>Converter</u> details 25 dialog.

Socket channels	\mathbf{X}
Server MILLIKAN	[Connect]
Background Noise Temperature Light Level	ок
Light Frequency	Edit
	Disable
	Help

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 30 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 <u>Socket channels</u> dialog.

Edit socket	channel 🛛	
Name on server	Temperature	
Local name	Temperature	
<u> </u>	Cancel Help Options	

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 <u>Parameter options</u> (31), click Options...

5.1.7.4 Device status

To access this dialog, click the Status button in the <u>Converter details</u> dialog.

Device status	
Server: MILLIKAN IP addr: 192.168.1.244 Version: 1.0 Status:	<u> </u>
	Help

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 [50] dialog.

Parameter optio	ns	
Battery voltage ☑ Use Parameter	Formatting	OK
Units	[°C	Cancel
Number display		Help
Field width	7	
Scaling for graphs	2	Conditioner
Minimum value	-270	Scaling
Maximum value	1370	Alarm

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 r 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 24 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 and 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 <u>Alarm settings</u> dialog for this measurement definition.

5.1.8.2 Parameter scaling

To access this dialog, click the Scaling button in the Parameter options and dialog.

Parameter scaling			
Scaling method	Equation	•	
Filename			
Input range: -270	. 1370 °C		
X = input, ε	eg (X -2.05) *1.15		(OK)
× * (9/5) +	32	~	File
			Cancel
		~	Help

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 31 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 2.5V 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 11.

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 <u>Scale file formation</u> 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 and dialog. To access it, click the Alarm button in the Parameter options and dialog.

Alarm settings		X	
🔲 Enable the alarm			
Lower threshold	-30	OK	
Upper threshold	39	Cancel	
Holdoff	0	Help	
🔲 Digital Output 1	put 1 🔲 Digital Output 3		
🔽 Digital Output 2	🔲 Digital C)utput 4	

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 selected b

Digital outputs can be used only in real-time recording mode 21.

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 <u>PLW Recorder</u>, you access this dialog by selecting Monitor from the Settings menu. From the <u>PLW Graph</u>, <u>PLW XY Graph</u>, and <u>Spreadsheet</u> windows, click (the measurement selection button).

Select parameters	
Battery voltage Sound level Pilot frequency	Cancel Help
Group	Clear Save

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 <u>Settings</u> menu.

Calculated parameters	
Fahrenheit	OK Add Edit
	Delete
	Help

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 ad 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 addition of 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 <u>Calculated</u> parameters at dialog.

Edit o	alculated parameter	
Name	3	
	Fahrenheit	
Input	parameters	
А	Battery voltage	
В	Sound level	
С	Pilot frequency	OK
D	_	Cancel
Е		Help
Fouat	ion (for example, 4×2.65 + B)	Options
A *	(9/5) + 32	~

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 111 topic for more information.

Options. Set the options (units, range etc) for this measurement from Parameter options 31.

5.1.9 Window-related

5.1.9.1 Graph options

To access this dialog, click \checkmark in the <u>PLW Graph</u> 7^{h} window.

Graph options 🔀				
Title	Experiment 1			
Format	Separate graphs Cancel			
Time axis sca	ale Manual 💌 Help			
Time format	Numeric			
Vertical axis s	scale Automatic 💌			
Update grapł	n every 1 samples			
🔽 Display m	arker: 🔽 Auto save on exit			

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

XY options	X
Title Temperature Dependency	OK]
Horizontal axis scale Automatic	Cancel
Vertical axis scale Automatic	Help
Display every 1 samples	
🔽 Auto save on exit	

To access this dialog, click **I** in the <u>PLW XY Graph</u> [●] 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.

Spreadsheet options		
🔽 Auto save on exit		
🔽 Auto scroll		
Time format Numeric 💌	Cancel	
Show individual readings	Help	
or Show aggregated readings		
First reading		
Average		
I Maximum		
Time interval per row 100 readings		

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 submenu in the File menu.

Colours	
Background	(OK)
Frame	Cancel
Grid	Default
Text	Help
Selection	
Traces 📃	

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 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 submenu in the File menu.

Temperat	ures	
		ОК
Units	Celsius 💌	Cancel
	Celsius Fahrenheit	Help

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 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 <u>PLW Recorder</u> shundow.

Display the pause button. Chooses whether \blacksquare is visible in the <u>PLW Recorder</u> $\$ 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 I nput channels... from the <u>Settings</u> 1^{gh} menu. Note: This dialog is accessible only when Recording method has been set to Real time continuous in the <u>Recording</u> 2^{th} dialog.

ADC10/12/40/42 Measurements	
Port USB-PP1	
Sound	
	Add
	Edit
	Delete
	Help

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 42 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 <u>ADC10/12/40/42 Measurements</u> ^[42] dialog.

ADC10/12/40/	42 Measurement	
Name Sour	ıd	<u> </u>
Measurement	dB	Cancel
	,	Help
Scan time	50000 us	Options

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 and dialog.

5.2.1.3 ADC-10/12/40/42 block

Accessed via the OK button in the <u>Converter details</u> bialog. Note: This dialog is accessible only when Recording method has been set to Fast block in the <u>Recording</u> bialog.

ADC10/12/40/42 block			X
Name Sound		(OK)
Total time	50000	us	Cancel
Number of samples	6000		Help
Sampling approximation based on			Trigger
 Total time stays constant Number of samples stays constant 			Options

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):

PicoLog			
The closest match to your settings is: 166 samples in 1494 us (total time)			
	Do you want to continue with these settings?		
	Yes No Cancel		

(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 <u>ADC10/12/40/42 Trigger</u> 4 dialog.

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

5.2.1.4 ADC-10/12/40/42 Trigger

Accessed via the Trigger... button in the <u>ADC10/12/40/42 block</u> all dialog.

ADC10/12/40/42 Trigger		
 ✓ Trigger enable Direction Rising ▼ Threshold 0 mV Delay 0 % 	Cancel Help	
✓ Auto trigger Auto trigger after 1000 ms		

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 <u>Converter details</u> ²⁵ dialog.

Device status	
ADC10/12/40/42 USB Driver V3.2 PICOPP.SYS V1.13	OK]
	Help

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 <u>Settings</u> menu. Note: This dialog is accessible only when Recording method has been set to Real time continuous in the <u>Recording</u> ^{[21}] dialog.

A	DC11/22 measurements	
	Port USB-PP1	
	Sound level	
	Frequency DC voltage	Add
		Edit
		Delete
		Help

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 46 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 46 dialog.

Edit ADC11 Measurement		
Name	Frequency	OK
Channel	2	Cancel
Measurement	Frequency	Help
Scan time	50000 us	Options

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 and dialog.

5.2.2.3 ADC-11/22 block

Accessed via the OK button in the <u>Converter details</u> bialog. Note: This dialog is accessible only when Recording method has been set to Fast block in the <u>Recording</u> bialog.

ADC11/22 block				
Port Text			OK	
Channel 1 Channel 2		^	Edit	
Channel 3 unused Channel 4 Channel 5 unused			Disable	
Channel 5 unused Channel 7 unused Channel 8 unused		~	Trigger	
No of complex	1000		Help	
INO OF SAMPLES	11000			
Total time	100000	us		
Sampling approximation based on				
 Total time stavs constant 				
C Number of samples stays constant				

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):

PicoLog				
	The closest match to your settings is:			
	166 samples in 1494 us (total time)			
Do you want to continue with these settings?				
Yes No Cancel				

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 48 dialog.

5.2.2.4 ADC-11/22 Trigger

Accessed via the Trigger button in the ADC11/22 block 47 dialog.

ADC11/22 1	rigger		
🔲 Trigger	enable	OK]	
Direction	Rising 💌	Cancel	
Channel	1 💌	Help	
Threshold	0 mV		
Delay	0 %		
Auto trigger after 1000 ms			

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 <u>Converter details</u> dialog.

Device status	
ADC11/22 USB Driver V4.4 ADC11 V2 on USB-PP1 PICOPP.SYS V1.13	[OK]
	Help

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 I nput channels... from the <u>Settings</u> 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 and 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 50 dialog.

Edit ADC16 Channel 🔀				
Name	Channel 1	OK		
Resolution/Cor	nversion Time (ms) 16 bits (657ms) 💌	Cancel		
Differential input enable (ch1,3,5,7 only)				
Filter Enable				
Filter Factor	10	Options		
Conditioner N	lone			

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 [31], 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 <u>Options | Conditioner</u> $\boxed{24}$ 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 <u>Converter details</u> ²⁵ dialog.

Device status	
ADC16 driver version 2.4 ADC16 Unit V10	(OK)
	Help

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 <u>Settings</u> menu.

A	DC-24 Channels					
	ADC-20 Channe	ls				X
	Name	Status	Range	Single Ended	Conversion Time	ОК
	Channel 1 Channel 2	Available Available				Edit
	Channel 3 Channel 4 Channel 5	Available Available Available				Disable
	Channel 6 Channel 7	Available Available				Cancel
	Channel 8	Available				Help
	- Mains frequency	50Hz		C 60H	Ηz	

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 <u>alarm</u> 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 53, Edit ADC-24 Channel 53 or ADC-24 Digital Channels 54 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 50Hz or 60Hz 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 $\overline{52}$ or ADC-24 Channels $\overline{52}$ dialog and then click Edit.

E	dit ADC-24 Channel		
ľ	Edit ADC-20 Channel		×
	Name Channel 1 Conversion Time (ms) Voltage Range	60 ms ▼ ±1250 mV ▼	Cancel Help Options

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 [31], 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 <u>alarm</u> and <u>alarm</u> output. To access the dialog, highlight an available digital input in the <u>ADC-24 Channels</u> and then click the Edit... button.

ADC-24	Digital C	hannels			
Name	Digital C	hannel 1	Cancel		
Display	y details —				
O N	lumerical 1	or 0			
ΘP	Pre-defined text (On/Off)				
C User defined text					
Replace	'On' with				
керіасе	'Off' with]			

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 <u>Converter details</u> dialog. This dialog is accessible only when Recording method has been set to Streaming in the <u>Recording</u> and the <u>Recording</u>.

ADC-24 Streaming		
ADC-20 Streaming		
Name Status Channel 1 In Use Channel 2 In Use Channel 3 In Use Channel 4 In Use Channel 5 In Use Channel 6 In Use Channel 7 In Use Channel 6 In Use Channel 7 In Use Scan time (ms) 1000 Conversion Time 60 ms Mains Frequency 60 Hz Image: Scan time stays constant Scan time stays constant Conversion time stays constant	Range Single Ended ±1250 Yes ±1250 Yes	OK Edit Disable Help

Edit. To edit a channel, highlight it and click the Edit button. This will open the Edit ADC-20 Streaming Channel or Edit ADC-24 Streaming Channel 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 <u>ADC-20 Streaming</u> or <u>ADC-24</u> <u>Streaming</u> of <u>ADC-24</u> <u>Streaming</u> dialog and then click the Edit... button.

E	Edit ADC-24 Streaming Channel 🛛 🛛 🔀				
	Edit ADC-20 Streamin				
	Name Channel	1	OK		
	Voltage Range	±1250 mV 💌	Cancel		
-	🔲 Differential input enat	ble	Help		

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 <u>Converter details</u> ²⁵ dialog.

Device status	
Driver version: 1, 3, 0, 1 Hardware version: 1 USB version: USB 1.1 Unit variant: 24	OK D
Calibration date: 15May09	Help

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 I nput channels... from the <u>Settings</u> menu.

ADC100 measurements	
Port LPT1	
ChA	ОК
Ch B	Add
	Edit
	Delete
1	Help

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 57 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 <u>ADC100/101 measurements</u> addressed via the Edit button in the <u>ADC100/101 measurements</u> and <u>ADC100/101 measurements</u>.

Edit ADC100 meas	urement	
Name Ch A		OK
Channel	Channel A 💌	Cancel
Measurement	DC Volts	
Voltage range	±5V 💌	Help
Scan time	50000 us	Options

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 and dialog.

5.2.5.3 ADC-100 Block

Accessed via the OK button in the <u>Converter details</u> 25^{-1} dialog. Note: This dialog is accessible only when Recording method has been set to Fast block in the <u>Recording</u> 21^{-1} dialog.

ADC100 Block			
Total time	10000	us	OK]
Number of samples	1000	-	Cancel
Sampling approximation	based on		Trigger
 Total time stays constant Number of samples stays constant 			Help
Name		Range	
ChA		±5V 💌	Options
Ch B		Off	Options

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 shall dialog.

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

5.2.5.4 ADC-100 Trigger

Accessed via the Trigger button in the ADC100 Block 58 dialog.

ADC100 Trigger 🛛 🔀		
I▼ Trigger	enable OK	7
Direction	Rising 💌	-
Channel	Channel A 💌 Cancel	
Threshold	0.000 mV	_
Delay	0 % Help	
✓ Auto tri Auto trigge	gger rafter 1000 ms	

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 <u>Converter details</u> ²⁵ dialog.

Device status	
ADC100/101 Driver V3.2 LPT1, No adapter pico.sys V2.1 136518 samples/sec	
	Help

This dialog displays details of the ADC status.

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 I nput channels... from the <u>Settings</u> menu.

ADC200 measurements	
Port USB-PP1	
Ch A Ch B	ок
	Add
	Edit
	Delete
	Help

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 and 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 of dialog.

Name Ch B	
Measurement DC Volts	
Channel A	
Voltage range	ок
	ancel
Scan time 100000 μs	Help
Frequency range 206667 Hz Op	otions

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 and dialog.

5.2.6.3 ADC-200 Block

Accessed via the OK button in the <u>Converter details</u> dialog. Note: This dialog is only accessible when Recording method has been set to Fast block in the <u>Recording</u> hialog.

ADC200 Block		
Timebase: 20 ns 💌	Number of samples:	500
Oversample (116): 1	Total run time:	10000 ns
Time per sample: 20 ns		
Range Name	AC/DC	
Ch A Off 💌	AC 💌	Options
Ch B Off 🗨	AC 💌	Options
Ch C		
Ch D		
Cancel	Help	Trigger

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 and dialog.

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

5.2.6.4 ADC-200 Trigger

Accessed via the Trigger button in the ADC200 Block and dialog.

ADC200 Trigger			
🔲 Trigger	enable	OK DK	
Direction	Rising 💌	Cancel	
Channel	Channel A 💌	Help	
Threshold	0.000 mV		
Delay	0 %		
☑ Auto trigger after 1000 ms			

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 <u>Converter details</u> alog.

Device status	
ADC200 Driver V4.86 ADC200-50 V7 on USB-PP1 Batch WJE95 Cal date 14Jun01 picopp.sys V1.13	(OK)
	Help

This dialog displays details of the ADC status.

5.2.7 PicoLog 1000 Series

5.2.7.1 PicoLog 1000 measurements

To access this dialog, assuming you have already set up PicoLog with a PicoLog 1000 Series converter as your converter, select I nput channels... from the <u>Settings</u> menu. Note: This dialog is accessible only when Recording method has been set to Real time continuous in the <u>Recording</u> 2^{1} dialog.

PicoLog1216 measurements	
Port Text	[OK]
Sound level Pilot frequency	Add
	Edit
	Delete
1	Help

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 and dialog so that you can edit the details.

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

5.2.7.2 Edit PicoLog 1000 Series Measurement

Accessed via the Edit button in the PicoLog 1000 Series measurements for dialog.

Edit PicoLog12	216 Measurement	
Name	Battery voltage	OK
Channel	1	Cancel
Measurement	DC Volts	Help
Scan time	10000 us	Options

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 and dialog.

5.2.7.3 PicoLog 1000 Series Block

Accessed via the OK button in the <u>Converter details</u> bialog. Note: This dialog is accessible only when Recording method has been set to Fast block in the <u>Recording</u> bialog.

PicoLog1216 block			
Port Text			ОК
Zone 1 Zone 2 Zone 3		^	Edit
Channel 4 unused Channel 5 unused			Disable
Channel 6 unused Channel 7 unused Channel 8 unused		~	Trigger
No of samples	500		Help
Total time	1	us	
Sampling approximation ba	ised on		
 Total time stays consta O Number of samples state 	int ys constant		

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):

PicoLog			
	The closest match to your settings is:		
	166 samples in 1494 us (total time)		
	Do you want to continue with these settings?		
	Yes No Cancel		

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 48 dialog.

5.2.7.4 PicoLog 1000 Series Trigger

Accessed via the Trigger button in the PicoLog 1000 Series block and dialog.

PicoLog1216	Trigger	
🔲 Trigger en	able	OK]
Direction F	Rising 💌	Cancel
Channel 1	•	Help
Threshold 0) mV	
Delay 0	%	
🔽 Auto trigge	r after 1000	ms

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.

5.2.7.5 Device status

Accessed via the Status button in the <u>Converter details</u> dialog.

Device status	X	
Driver version: 1, 0, 0, 8 Hardware version: 1 USB version: USB 1,1 Unit variant: PicoLog1216	()	
Serial: AU0057139 Calibration date: 09Jun09	Help	

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

5.2.8 PicoScope 2000 Series

5.2.8.1 PicoScope 2000 Measurements

To access this dialog, assuming you have already set up PicoLog with a PicoScope 2000 series unit, select I nput channels... from the <u>Settings</u> menu and click OK. Note: This is accessible only when the Recording method has been set to Real time continuous in the <u>Recording</u> dialog.

PicoScope2000 Measurements	
Serial: VDR61/356	ОК
Line 1 Line 2	Add
	E dit
	Delete
	Help

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 <u>PicoScope2000</u> Edit Measurement and dialog so you can enter the details.

Edit. To edit a measurement in the list, highlight it and click Edit. This will open the <u>PicoScope2000 Edit Measurement</u> for 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 PicoScope 2000 Edit Measurement

Accessed via the Edit button in the PicoScope2000 Measurements ad dialog.

PicoScope2000 Edit Measurement 🛛 🛛			
Name	Line 1	OK]	
Channel	Channel A 🗾	Cancel	
Voltage range	±50mV 💌	Apply	
Measurement	DC Volts	Help	
Scan time	100000 us		
Frequency range:	20 18601 Hz	Options	

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 7 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 and dialog.

5.2.8.3 PicoScope 2000 Block Mode

Accessed via the OK button in the <u>Converter details</u> dialog. Note: This dialog is accessible only when Recording method has been set to Fast block in the <u>Recording</u> and dialog.

PicoScope2000 Block-Mode				
Timebase:	50 ns 💌		ОК	
Number of samples:	500	500		
Oversample (0256):	1		Apply	
Time per sample:	50 ns		Help	
Total run time:	25 us		Trigger	
Range	Name	AC/DC		
Ch A Auto 💌	Line 1	AC 💌	Options	
Ch B Auto 💌	Line 2	AC 💌	Options	
Ch C 🗾		~	Options	
Ch D 💌		Ţ	Options	

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 Autoranging 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 72 dialog.

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

5.2.8.4 PicoScope 2000 Streaming

Accessed via the OK button in the <u>Converter details</u> ²⁵ dialog. Note: This dialog is accessible only when Recording method has been set to Streaming in the <u>Recording</u> ²¹ dialog.

PicoScope2000 Streaming				
Numbe	er of samples:	500		ОК
Sample	e interval: 000 milliseconds	1		Cancel
1 1	000 miniseconds			Apply
	Range	Name	AC/DC	Help
Ch A	Auto 💌	Line In	AC 💌	Options
Ch B	Auto 💌		AC 💌	Options
Ch C	_		-	Options,,,
Ch D	_	J	V	Options,

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 and dialog.

5.2.8.5 PicoScope 2000 Trigger

Accessed via the Trigger... button in the PicoScope2000 Block-Mode rol dialog.

PicoScope2000 Trigger 🛛 🛛 🔀				
Channel	None	•	OK I	
Direction	Rising	•	Cancel	
Threshold	15000	mV	Help	
Delay	-100	%		
✓ Auto trigger after 1000			ms	

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.

72

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).

5.2.8.6 Device status

Accessed via the Status button in the <u>Converter details</u> dialog.

Device status	
Driver version: 2, 0, 8, 2 Hardware version: 16 USB version: 2,0 Unit variant: 2203	(OK]
Calibration date: 04Apr08	Help

5.2.9 PicoScope 3000 Series

5.2.9.1 PicoScope 3000 Measurements

To access this dialog, assuming you have already set up PicoLog with a PicoScope 3000 series unit, select I nput channels... from the <u>Settings</u> menu and click OK. Note: This is accessible only when the Recording method has been set to Real time continuous on the <u>Recording</u> ^[21] dialog.

PicoScope3000 Measurements	
Serial: IJY38/1	ок
Line 1 Line 2	Add
Line 3	Edit
	Delete
	Help

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 <u>PicoScope3000 Edit Measurement</u> 74 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 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 3000 Edit Measurement

Accessed via the Edit button in the PicoScope3000 Measurements dialog.

PicoScope3000 Edit Measurement			
Name	Line 1	OK)	
Channel	Channel A 🗾 💌	Cancel	
Voltage range	±20mV 💌	Apply	
Measurement	DC Volts	Help	
Scan time	100000 us		
Frequency range:	20 18601 Hz	Options	

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 7 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 and dialog.

5.2.9.3 PicoScope 3000 Block Mode

Accessed via the OK button in the <u>Converter details</u> dialog. Note: This dialog is accessible only when Recording method has been set to Fast block in the <u>Recording</u> and dialog.

PicoScope3000 Block-Mode				
Timebase:	100 ns 💌		ОК	
Number of samples:	500		Cancel	
Oversample (0256):	1		Apply	
Time per sample:	100 ns		Help	
Total run time:	50 us		Trigger	
Range	Name	AC/DC		
Ch A Auto 💌	Line 1	AC 💌	Options	
Ch B Auto 💌	Line 2	AC 💌	Options	
Ch C 🗾		_	Options	
Ch D 🗾		V	Options	

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 Autoranging 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 77 dialog.

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

5.2.9.4 PicoScope 3000 Streaming

Accessed via the OK button in the <u>Converter details</u> ²⁵ dialog. Note: This dialog is accessible only when Recording method has been set to Streaming on the <u>Recording</u> ²¹ dialog.

PicoScope3000 Streaming 🛛 🔀						
Number of samples:		500			ок	
Sample interval:		1			Cancel	
1 1000 milliseconds						Apply
	Range	Name		AC/D	с.	Help
Ch A	Auto 💌	Line 1		AC	•	Options
Ch B	Auto 💌	Line 2		AC	•	Options
Ch C	~				-	Options
Ch D	_	<u></u>			-	Options

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 and dialog.

5.2.9.5 PicoScope 3000 Trigger

Accessed via the Trigger... button in the PicoScope3000 Block-Mode 75 dialog.

PicoScope3000 Trigger 🛛 🛛					
Channel	Channel 4	4 💌	ОК		
Direction	Rising	•	Cancel		
Threshold	1000	mV	Help		
Delay	50	%			
✓ Auto trigger after 1000 ms					

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).

5.2.9.6 Device status

78

Accessed via the Status button in the Converter details 25 dialog.

Device status	
Driver version: 3, 6, 4, 8 Hardware version: 3 USB version: 2.0 Unit variant: 3223	<u> </u>
Calibration date: 25Aug06	Help

5.2.10 Demo

5.2.10.1 Demo measurements

To access this dialog, assuming you have opened the demo version of PicoLog, select I nput channels... from the <u>Settings</u> menu.

Demo measurements	
Port Status	
Ch A	OK
Ch B	Add
	Edit
	Delete
	Help

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 add 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 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 Edit demo measurement

Accessed via the Edit button in the <u>Demo measurements</u> alalog.

Edit demo measurement				
Name	Ch B	_		
Channel	Channel A 💌	OK)		
Measurement	DC Volts	Cancel		
Voltage range	±5V 💌	Help		
Scan time	100000 us	Options		

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 and dialog.

5.2.10.3 Demo block

Accessed via the OK button in the <u>Converter details</u> bialog. Note: This dialog is only accessible when Recording method has been set to Fast block in the <u>Recording</u> bialog.

Demo block		
Time per sample	10 ns 💌	OK Cancel
Number of samples	1000	Trigger
		Help
Name	Range	
ChA	±20V 💌	Options
Ch B	±50mV 💌	Options

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 and dialog.

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

5.2.10.4 Demo streaming

Accessed via the OK button in the <u>Converter details</u> 2^{5} dialog. Note: This dialog is only accessible when Recording method has been set to Fast block on the <u>Recording</u> 2^{1} dialog.

Demo Streaming		X
Number of samples:	1000	OK
Sample interval: 1 1000 milliseconds	1	Cancel
		Apply
Range	Name	Help
Ch A Off 🗨		Options
Ch B Off 💌		Options

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 and dialog.

5.2.10.5 Demo trigger

Accessed via the Trigger button in the <u>Demo block</u> and dialog.

Demo Trigge	er	
✓ Trigger Direction	enable	
Channel	Channel A	
Threshold Delau	1000 mV Hel	P
Velay	gger 0 ms	

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.

5.2.10.6 Device status

Accessed via the Status button in the <u>Converter details</u> additional dialog.

Device status	
PLW Demo V1.0	OK)
	Help

5.2.11 DrDAQ

5.2.11.1 DrDAQ measurements

To access this dialog, assuming you have already set up PicoLog with a DrDAQ unit, select I nput channels... from the <u>Settings</u> menu.

DrDAQ measurements	
Port USB-PP1	
Sound Waveform	OK
Voltage Resistance pH Temperature	Add
External 1 External 2	Edit
,	Delete
Digital output On when recording 💌	Help
LED On when recording 💌	

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 DrDAO Measurement and 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

5.2.11.2 Edit DrDAQ Measurement

Accessed via the Edit button in the DrDAQ measurements ad dialog.

Edit DrDAQ Measurement					
Name	Sound Level				
Channel	Sound Level 💌	0K			
Scaling	Sound Level 🗨	Cancel			
Measurement	DC signal 🔍 💌	Help			
Scan time	50000 us	Options			

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 at dialog.

5.2.11.3 DrDAQ block

Accessed via the OK button in the <u>Converter details</u> 25 dialog. Note: This dialog is accessible only when Recording method has been set to Fast block on the <u>Recording</u> 21 dialog.

DrDaq block		X
Port Text		ОК
Sound Waveform Sound Level Voltage unused		Edit
Resistance unused pH unused		Disable
Temperature unused Light unused External 1 unused		Trigger
No of samples	1000	Help
Total time	100000 us	
C Sampling approxima	tion based on	
 Total time stays 	constant	
C Number of samp	les stays constant	

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):

PicoLog	
♪	The closest match to your settings is: 166 samples in 1494 us (total time)
	Do you want to continue with these settings?
	<u>/es N</u> o Cancel

(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 DrDAO Trigger and dialog.

5.2.11.4 DrDAQ Trigger

Accessed via the Trigger button in the DrDAQ block and dialog.

DrDAQ Trig	ger	
🔽 Trigger	enable	
Channel	Sound Level	•
Threshold	90 dBA	
Direction	Rising 💌	OK
Delay	0 %	Cancel
🔽 Auto trig	ngerafter 1000 ms	Help

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.

5.2.11.5 Device status

Accessed via the Status button in the <u>Converter details</u> ²⁵ dialog.

Device status	
DRDAQ USB Driver V3.7 DRDAQ on USB-PP1 PICOPP.SYS V1.13	[OK]
	Help

5.2.12 RH-02

5.2.12.1 RH-02 Channels

To access this dialog, assuming you have already set up PicoLog with an RH-02 unit, select Input channels... from the <u>Settings</u> 19 menu.

RH02 Channels	X
Port COM6	ОК
Temperature	Edit
Humidity	Disable
	Help

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 and dialog so that you can enter the details.

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

5.2.12.2 Edit RH-02 Channel

Accessed via the Edit button in the RH02 Channels ad dialog.

Edit RH02 Ch	annel	×
Name	Temperature	
🥅 Filter Enab	le	
<u>ОК</u>	Cancel Help Options	

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 [31], click the Options... button.

88

5.2.12.3 Device status

Accessed via the Status button in the <u>Converter details</u> dialog.



5.2.13 HumidiProbe

5.2.13.1 HumidiProbe Channels

You should have previously set up PicoLog with a HumidiProbe unit. To access this dialog, select I nput channels... from the <u>Settings</u> 19 menu.

HumidiProbe	X
	ОК
Temperature Humidity	E dit
	Disable
	Help

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 and dialog so that you can enter the details.

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

5.2.13.2 Edit HumidiProbe Channel

Accessed via the Edit button in the HumidiProbe Channels ad dialog.

Edit HumidiP	robe Channel		
Name	Temperature		
🥅 Filter Enabl	le		
OK)	Cancel	Help	Options

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 [31], click the Options... button.

5.2.13.3 Device status

Accessed via the Status button in the <u>Converter details</u> dialog.

Device status	
Driver Version: 1.7.0.0 Hardware Version: 1 Unit Variant: 1 Serial and Batch: HJL30/53 Cal Date: 190ct05	(OK]
	Help

This dialog displays details of the HumidiProbe's status.

5.2.14 USB TC-08

5.2.14.1 USB TC-08 Channels

To access this dialog, assuming you have already set up PicoLog with a USB TC-08 unit, select I nput channels... from the <u>Settings</u> 19 menu.

TCO8 Channels	
Port COM6	OK]
Channel 1 Channel 2	Edit
Channel 3 unused Channel 4	Disable
Channel 5 unused Channel 6 unused Channel 7 unused Channel 8 unused Cold junction unused	Help
Resolution 16 bit (200ms/ch)	

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 doubleclick with the mouse). This will open the Edit TCO8 Channel add 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.

5.2.14.2 Edit USB TC-08 Channel

Accessed via the Edit button in the TCO8 Channels 2 dialog.

Edit TCO8 Chan	nel	X
Name	Zone 1	ОК
Thermocouple	Туре К	Apply
✓ Filter Enable	Filter Factor 2	Cancel
		Help
		Options

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 \pm 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 and, click Options...

5.2.14.3 Device status

Accessed via the Status button in the <u>Converter details</u> dialog.

Device status	
Driver version: 1, 8, 0, 6 Picopp.sys version: 01.13 Hardware version: 1 Unit variant: 3	OK]
Batch and serial: XFY16/151 Calibration date: 220ct08	Help

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.

5.2.15 Serial TC-08

5.2.15.1 TC-08 Channels

To access this dialog, assuming you have already set up PicoLog with a TC-08 unit, select I nput channels... from the <u>Settings</u> menu.

TC08 Channels	
Port COM6	OK]
Channel 1 Channel 2 Channel 3 unused Channel 4	Edit Disable
Channel 5 unused Channel 6 unused Channel 7 unused Channel 8 unused Cold junction unused	Help
Resolution 16 bit (200ms/ch)	

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 doubleclick with the mouse). This will open the Edit TCO8 Channel Add 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.

5.2.15.2 Edit TC-08 Channel

Accessed via the Edit button in the TCO8 Channels Add dialog.

Edit TCOB Channel		
Name	Channel 1	OK]
Thermocouple	Туре К 🗨	Apply
🔽 Filter Enable	Filter Factor 2	Cancel
		Help
		Options

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 options for a parameter [31], click this button.

5.2.15.3 Device status

Accessed via the Status button in the <u>Converter details</u> ²⁵ dialog.

Device status	
TC08 driver V2.6 TC08 Unit ∨64	(OK)
	Help

5.2.16 TH-03

5.2.16.1 TH-03 Channels

To access this dialog, assuming you have already set up PicoLog with a TH-03 unit, select I nput channels... from the <u>Settings</u> menu.

TH03 Channels	X
Port COM6	ОК
Channel 1	Edit
Channel 2 Channel 3	Disable
	Help

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 THO3 Channel and dialog so that you can enter the details.

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

5.2.16.2 Edit TH-03 Channel

Accessed via the Edit button in the TH03 Channels of dialog.

Edit TH03	Channel	
Name	Channel 1	OK
	EL 015 temperature	Cancel
тптуре		Help
🥅 Filter B	nable Filter Factor 10	Options

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.
- ELO31 light is a sensor suitable for measuring light intensity.
- ELO39 (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

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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 options for a parameter 31, click the Options... button.

5.2.16.3 Device status

Accessed via the Status button in the Converter details 25 dialog.

Device status	
TH03 driver version 2.5 TH03 Unit V2	ОК
	Help

5.2.17 PT104

5.2.17.1 PT104 channels

To access this dialog, assuming you have already set up PicoLog with a PT104 unit, select I nput channels... from the <u>Settings</u> menu.

PT-104 channels	
Port COM6	ОК
Channel 1 Channel 2 Ch3 unused	E dit
Ch4 unused	Disable
Mains frequency	Help
● 50Hz	

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 PT104 Channel addition of the 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.

5.2.17.2 Edit PT104 Channel

Accessed via the Edit button in the Pt104 channels a dialog.

Edit PT104 Channel		
Name	Channel 2	
Data type	Pt100 -	
Circuit	Four wire	
🥅 Filter Enable		
<u> </u>	Cancel Help Options	

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 31, click the Options... button.

5.2.17.3 Device status

Accessed via the Status button in the <u>Converter details</u> dialog.

Device status	
pt104 Driver V1.8 Unit V1.1 Calibration 1 Calibration date 10Mar03 Batch AMY40 5019 -4963 175	OK]
	Help

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 21^{n} mode but with only one in fast block 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 21 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 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.

6.8 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.

6.9 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.

6.10 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.

6.11 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
рН	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, and to simplify usage, block mode is disabled if PicoLog is installed for DrDAQ.
6.12 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.

6.13 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.

6.14 PT-104

The PT-104 temperature data logger works with PT100 sensors, and can also be used to measure voltages up to 2500 mV and resistances up to 375 $\,$. The conversion time for the PT-104 is 720 ms for full accuracy.

- 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 serial ports

6.15 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 \pm 70 mV. The thermocouples are cold-junction compensated (the cold junction temperature can be monitored as an extra channel in PicoLog).

The USB TC-08 is compatible with USB 1.1 and supports streaming with a guaranteed sampling interval of 40 milliseconds per active channel + 40 milliseconds cold junction (for example, for 3 active channels, the minimum interval is 160 milliseconds).

(PicoLog does not currently support streaming operation)

You can connect up to ten converters to PicoLog simultaneously. These can all be USB TC-08s for a maximum of 80 thermocouple channels.

6.16 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.

6.17 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.

6.18 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 <u>Transfer data over an IP network</u> section for detailed instructions on setting up a link.

6.19 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

DataPath	Alternate path for data files. Note: Do not attempt to save your data directly to a floppy disk, as this would cause Picol og to operate unacceptably slowly
UserName	Text to display in the footer for printed reports
Language	Language code
Serial	Serial number for Picol og
VersionWarning [Preferences]	Version warning state (tells to check web for update)
Colour0	(0 to 16) Colour of a graph component in COLORREF format (see <u>Colours</u> 40 dialog)
CustomColour0	(0 to 15) Custom colors used by the standard Windows colour selection dialog in COLORREF format (see <u>Colours</u> and dialog)
BeepOnReading BeepOnLamp BeepOnLlarm	Sound options (see <u>Sounds</u> 40 dialog)
Fahrenheit	See <u>Temperatures</u> 41 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;	the length, in bytes, of this header
char		signature[40];	"PicoLog for Windows"
UNS32		version;	
UNS32		no_of_parameters;	no 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		<pre>max_samples;</pre>	
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		<pre>start_time;</pre>	
long		<pre>minimum_time;</pre>	
long		<pre>maximum_time;</pre>	
char		notes[1000];	
long		current_time;	
unsigned	short	stopAfter;	
unsigned	short	maxTimeUnit;	
unsigned	long	maxSampleTime;	
unsigned	long	startTimeMsAccuracy;	
unsigned	long	previousTimeMsAccuracy;	
unsigned	long	noOfDays;	
UNS8		spare[58];	

Note: Do not attempt to save your data directly to a floppy disk.

Definition correct as of R5.20.1.

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 **Eile** 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

Note: Do not attempt to save your data directly to a floppy disk.

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 equation (11), 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 and 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 <u>Signal Conditioner</u> $\boxed{24}$ 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 32 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:

-р	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 19 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 brackets	Usage (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)	$\log 10(100) = 2$
In	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 (dB	A)
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 and 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.



Index

.ini files105, 107.pls files106, 107.plw files106, 107.prn files10.txt files10.wmf files14

A

ADC 3 ADC-10/12/40/42 100 Adding measurements 42 Defining a block 43 Editing measurements 42 Status check 45 Trigger setup 44 ADC-100/101 101 Adding measurements 57 Defining a block 58 Editing measurements 57 Status check 60 Trigger setup 59 ADC-11/22 100 Adding measurements 46 Defining a block 47 Editing measurements 46 Status check 49 Trigger setup 48 ADC-16 100 Editing channels 50 Selecting channels 50 Status check 51 ADC-20/ADC-24 100 Editing channels 53 Editing streaming channels 56 Selecting channels 52 Status check 56 Streaming mode 55 ADC-200 101 Adding measurements 61 Defining a block 62 Editing measurements 61 Status check 64 Trigger setup 63 ADC-24 Digital input channels 54 Adding a calculated parameter 35 Adding a converter 26 Adding new measurements 12 Alarm 33 Assigning a channel name 30

В

Buttons Back a file 6 Copy to clipboard 14 Forwards a file 6 Help 5 New file 5, 13, 14 Open file 6 Pause/resume 5 Print view 14 Re-record 5, 13 Select channels 12 Start recording 5,13 Stop recording 5 View Graph 13 View Notes 13 View options 15 View spreadsheet 13

С

Channels Maximum number 2 Client 16, 104 Clipboard 7, 9, 10 Command line 109 Connecting to a server 29 Converters 1 ADC-10/12/40/42 100 ADC-100/101 101 ADC-11/22 100 ADC-16 100 ADC-20/ADC-24 100 ADC-200 101 Demo 102 DrDAQ 102 HumidiProbe 103 Maximum number 2 PicoLog 1000 101 PicoScope 2000 101 PicoScope 3000 102 103 RH-02 TC-08 103 TH-03 104 USB TC-08 103

Data file 106 DDE 110 Deleting a converter 26 Demo converter 102 Adding measurements 79 Defining a block 80 Editing measurements 79 Status check 82 Streaming mode 81 Trigger setup 81 **Dialog** boxes Alarm settings 33 Calculated parameters 35 Colours 40 Confirm File delete 23 Converter details 25 Converter preferences 27 Converters 26 Device status 30 Edit calculated parameters 36 Edit socket channel 30 Graph options 37 IP Socket options 28 Parameter options 31 Parameter scaling 32 Print 23 Recording 21 Sampling Rate 22 Select parameters 34 Signal Conditioner 24 Socket channels 29 Sounds 40, 41 Spreadsheet options 39 Temperatures 41 XY options 38 Displaying data 13 DrDAQ 102 Adding measurements 83 Defining a block 85 Editing measurements 84 Status check 87 Trigger setup 86

E

Editing a calculated parameter 36 Editing a converter 26 Editing socket channels 29 Enabling a client 28

28 Enabling a server Enabling an alarm 33 Enabling data and time scaling on a graph 15 Entering scaling details 12 Equation notation 111 Equipment 100 Excel 110 Exporting a graph to a word processor 14 Exporting data to a spreadsheet 14

F

Facilities 1 File menu Delete File 18 Exit 18 New data 18 New settings 18 Open 18 Preferences 18 Save as... 18 File types .ini 105, 107 106, 107 .pls .plw 106, 107 .prn 10 10 .txt .wmf 14

G

Graph controls 7

Η

Help menu About... 20 Contents 20 Guided tour 20 Index 20 This view 20 Using help 20 HumidiProbe 103 Editing channels 90 Selecting channels 90 Status check 91

Introduction 1 IP network 16, 104 IP socket connection 30 IP sockets 16, 104 Index

IP/UDP protocol 104

К

Keyboard shortcuts 20

L

Legal information 3 Lock-up Escaping from 48, 67

Μ

Mains noise rejection 52 Mathematical notation 111 Measurement types Calculated values 2 Multiple values 2 Single readings 2 Measurements 2 Menu bar 18 Menus File 18 Help 20 View 19 Menus. Settings 19 Monitor window 5 Multiple programs 109 Multiple recorders 17

Ν

Networking 16 Notes window 4, 11

0

Online help Contents tab 1 Index tab 1 Oscilloscopes PicoLog 1000 series units 101 PicoScope 2000 series units 101 PicoScope 3000 series units 102 Overview 1

Ρ

PicoLog 1000 series 101 Adding measurements 65 Defining a block 66 Editing measurements 65 Status check 68

Trigger setup 67 **PicoLog components** 4 Monitor window 5 Notes window 4, 11 PLW Graph window 4,7 PLW Player window 4,6 PLW Recorder window 4, 5 PLW XY Graph window 4,9 Spreadsheet window 4, 10 PicoScope 2000 series 101 Adding measurements 69 Defining a block 70 Editing measurements 69 Status check 73 Streaming 71 Trigger setup 72 PicoScope 3000 series 102 Adding measurements 74 Defining a block 75 Editing measurements 74 Status check 78 Streaming 76 Trigger setup 77 Player controls 6 PLW Graph window 4 Buttons 7 Horizontal controls 7 Vertical controls 7 PLW Player window 4 **Buttons** 6 Controls 6 PLW Recorder window 4, 5 Buttons 5 Controls 5 Range indicators 5 PLW XY Graph window 4 Buttons 9 Horizontal controls 9 Vertical controls 9 Preferences file 105 Preferences menu Colours 18, 40 Converter 18 **IP** Sockets 18 Language 18 Recorder 18 Sound 18, 40, 41 Temperature 18, 41 Printing 14, 23 PT104 Editing channels 98 Selecting channels 98

Q

Quattro Pro 110

R

Recorder controls 5 Recording Fast block mode 2, 12, 21 Real time continuous mode 2, 12, 21 Repeating a run 13 RH-02 103 Editing channels 88 Selecting channels 88 Status check 89 Running multiple recorders 17 Runs 11, 12

S

Safety 3 Sampling interval 22 Sampling rate 22 Scaling 12, 31, 32, 108 Selecting measurements 34 Selecting measurements to display 12 Selecting the converter type 25 Server 16, 104 Settings Converter details 12 Recording method 12 Settings file 107 Settings menu Calculated parameters 19 Input channels... 19 Monitor 19 Recording 19 Sampling... 19 Setttings Sampling rate 12 Signal conditioner file 109 Signal conditioners 104 Simultaneous recording 17 Spreadsheet window 4, 10 Starting a new run 12 Starting a recording 13

Т

TC-08 103

Editing channels 94 Selecting channels 94 Status check 95 Technical information 105 TH-03 104 Editing channels 96 Selecting channels 96 Status check 97 Transferring data over an IP network 16 Trigger ADC-10/12/40/42 44 ADC-100/101 59 ADC-11/22 48 ADC-200 63 demo device 81 DrDAQ 86 PicoLog 1000 Series 67 PicoScope 2000 Series 72 PicoScope 3000 Series 77 Types of window 13

U

UDP/IP protocol 104 USB TC-08 103 Editing channels 92 Selecting channels 92 Status check 93

V

View menu Graph 19 Notes 19 Player 19 Spreadsheet 19 XY Graph 19

Х

XY Graph controls 9

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