

GUARDIAN

Guardian Viewer Step-by-Step Guide

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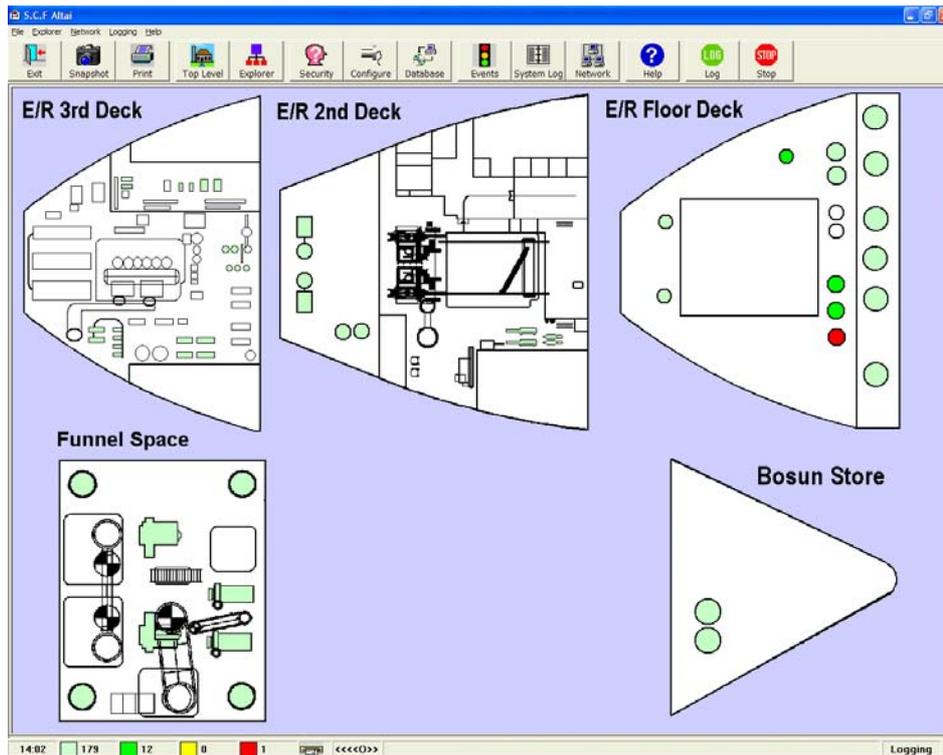
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CHAPTER 1 Operating the System

Guardian Main Screen

Below is an example of the front screen that is normally seen in Guardian. It is also referred to as the *Top Level*. This example shows various views of machinery on a ship. From this screen, all the other screens and functions can be accessed.



Principal Features

The main screen shows the areas of the ship where equipment is being monitored. There are buttons that provide specific functions, and drop-down menus are also available.

Colour Code

The mimics represent the plant, machine trains, and the machines themselves. There are three main colours used to show the status of an element. These are Green, Yellow and Red. These correspond to OK, Alert and Alarm status for the element.

Faded Green is also used on the mimics to show points that are not active. This will report all points that are not active on start-up and, when running, will show if signals cease to be received from speed sensors or points that use speed sensors to derive their readings. Note that if a node ceases to report, elements will change to faded green. The status of the node can be seen from the network check.

The “traffic lights” at the bottom left of the screen provide a count of points that are OK, in Alert and in Alarm.

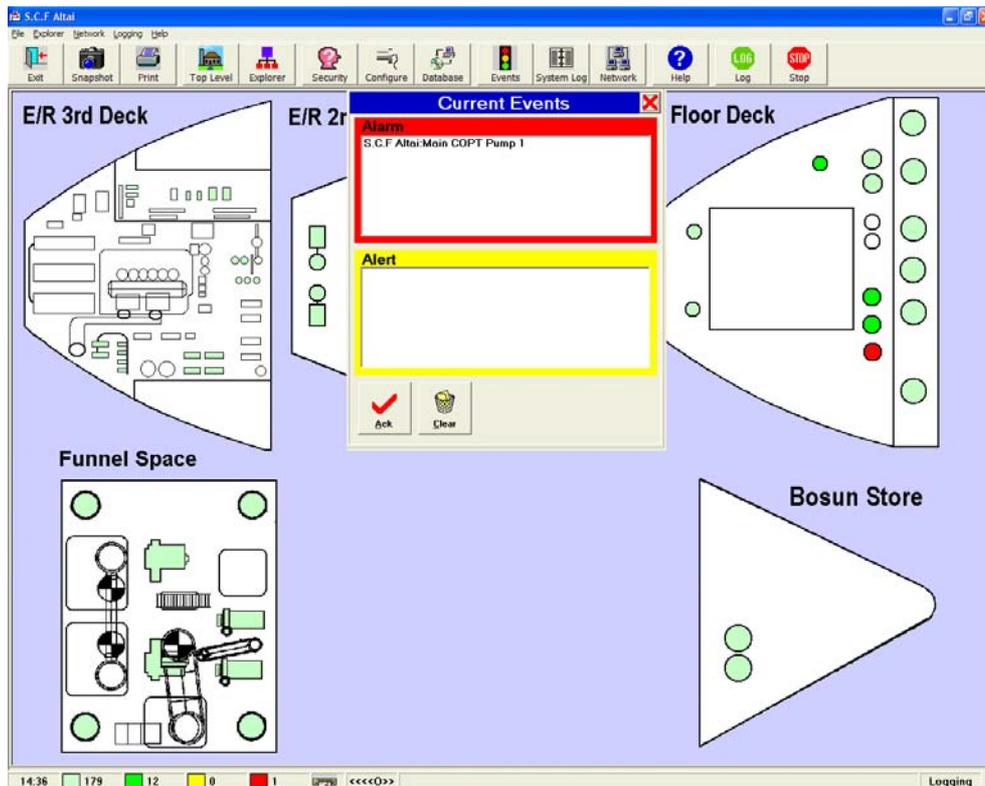
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Point Selection

To select a machine, click on it in the mimic. You will then see a **Machine View**. The **Machine View** shows the measurements for each point on a machine (see later).

Alerts and Alarms

As soon as an alert or alarm is registered by the system, a pop-up box for **Current Events** appears. This will appear for any new Alert or Alarm and will pop up over any other screen you are currently viewing in Guardian.



In addition, the relevant areas of the mimic(s) will turn to yellow or red.

The traffic light counters at the bottom left of the screen will give the new totals of points currently OK, in alert or in alarm.

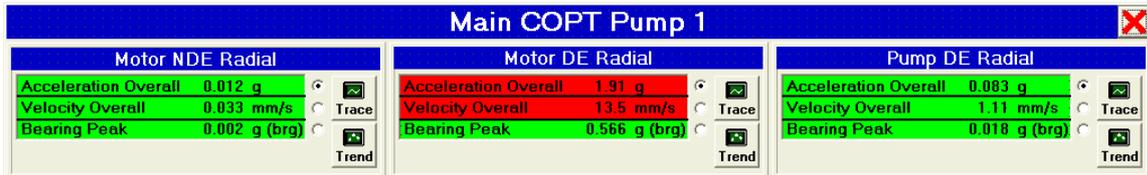
From the **Current Events** pop-up, the readings can be acknowledged by clicking on the **Ack** button. They can be cleared by clicking on the **Clear** button but only if the measurement has returned to OK status.

Double clicking on one of the entries in the **Alerts** or **Alarms** sections will bring up the **Machine View** with the associated measurements.

Machine View

Clicking on a bottom level mimic on any of the machines indicated can access the **Machine View**. This example shows a complete machine with three sensors. A sensor can give rise to several readings. Double clicking on one of the entries in the pop-up **Current Events** box is another method of accessing a **Machine View**.

The **Machine View** measurements are in boxes that can appear as different colours



as follows:

Green: OK

Yellow: Measurement in Alert

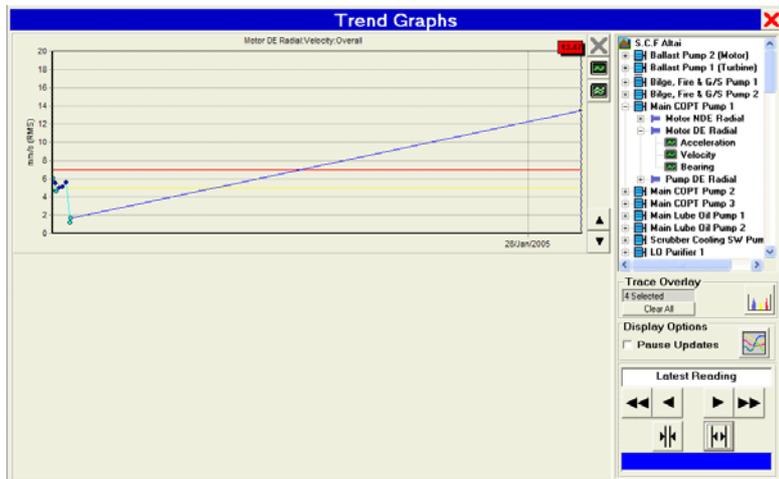
Red: Measurement in Alarm

Faded Green: Point / Node inactive

From the **Machine View**, you can select which measurement to view using the radio buttons beside each measurement. There are buttons to display either a **Trace** or a **Trend**.

Trend View

This shows the trend of the readings for any measurement type.



Colour Conventions

Yellow Line: The Alert Level

Red Line: The Alarm Level

Dark Blue Circle: Scheduled Measurement Point

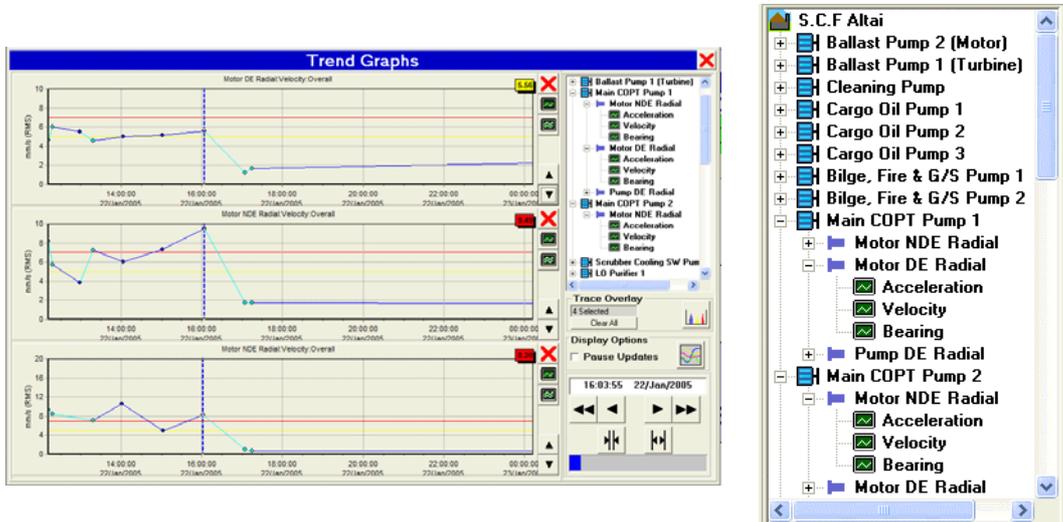
Light Blue Circle: Named Measurement Point

Magenta Circle: Measurement Point selected for Overlay

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Multiple Trends

When first accessed, normally only one trend graph will be visible. Additional trends can be selected using the Point Explorer area on the top right of the **Trend Graphs** screen. Up to five trends can be viewed together. Although the type of data measurement for each trend may be different, they must be the same if a Merge operation is to be performed.



Trend Point Value

The value of the latest point on a trend is displayed in a box at the top right of the trend graph. The colour of the box shows the status of the point. If a cursor is being used to select a point, this box displays the value at the cursor position. Green is OK, Yellow is Alert and Red is Alarm.



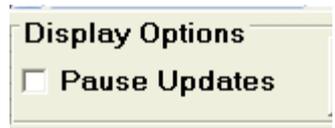
Trend Value Axis Control

This control allows scaling of the vertical axis of the trend graph.



Trend Updating

The trend graphs will normally update as data is acquired. The current point is always at the extreme right of the trend graph, but may be out of view if the screen has been zoomed. If working at the right hand end of the trend screen, it may be desirable to pause the updates, to avoid the trend graph jumping when a new reading is taken. A check mark in the **Pause Updates** box will do this.



View Traces (Spectra)

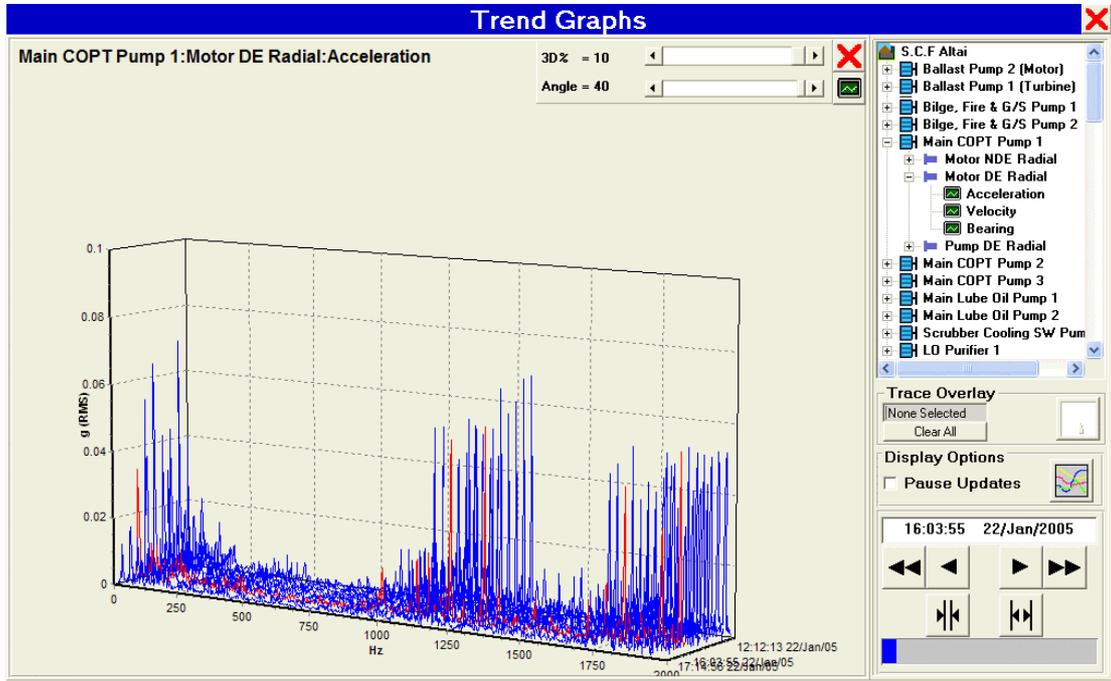
The large red cross will switch off a trend in the multiple trend view.



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The top green button (single white trace line) will display the trace (spectrum) for the current reading, or if a cursor is being used, for the point at the cursor position.

The lower green button (multiple white trace lines) will display a waterfall of several spectra from the trend.

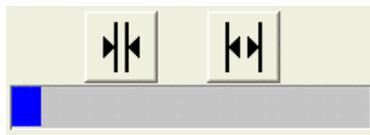


The 3D representation can be controlled using the slider bars at the top of the screen to alter the angles of presentation. It is also possible to move the presentation by right clicking and dragging. The currently selected point on the trend is shown as a red spectrum, and the date range for the spectra is shown at the bottom right.

Trend Time Scale

It is possible to expand or contract the timebase for the Trends. This is done using the two buttons in the control shown here. The left hand button contracts the time viewed, while the one on the right extends it.

It is also possible to move the blue section in the bar under the controls by clicking and dragging to change the section of time on view.



Trend Cursor

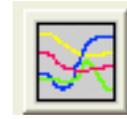
In the browse mode, a cursor is available to pick historical points for analysis. The cursor may be moved by pointing to any point on the trend graph or by using the arrow keys on the control shown here. The single arrows move the cursor one point at a time. The double arrows move the time slice incrementally.



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Trend Overlays

There is an overlay function for trends. To select the trends you wish to overlay, select multiple trend graphs as shown above. The graphs must all be of the same type – e.g. they should all be g_{brg} or velocity for example. Once selected, press the button shown here to display all the traces on the same graph. Up to four trends may be merged.



Deleting Trend Points

Individual points in a trend may be deleted. You need security clearance to be at level 1 at least to do this. In the browse mode, select the point you wish to delete. Press the delete key on your keyboard. This option is useful for deleting spurious readings. Mass deletion of points is easier using the **Database Management** tools.

Overlaying Traces

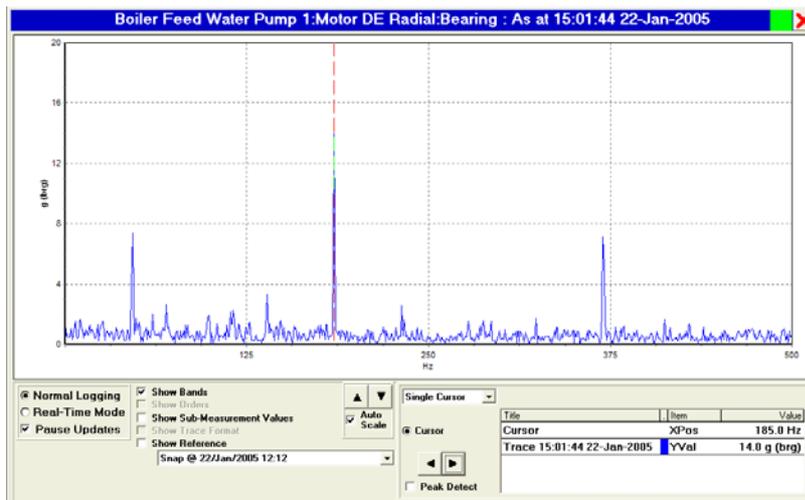
As well as overlaying trends onto the same graph, it is possible to select multiple measurement points from one or more Trend graphs in order that they are displayed upon the same trace graph.



Measurement points are selected by double-clicking their points on the trend graph. The number of points currently selected is listed in the Trace Overlay frame. To deselect a point, simply double-click it again. To deselect all of the points click the **Clear All** button.

Once you have selected all of the points you wish, click the button to the right and the traces will be displayed in the same manner as if only one point had been selected. Note that in the same manner as the trend Overlay, all of the points must be of the same type – e.g. they should all be g_{brg} or velocity for example.

Trace Screens



Trace screens can be arrived at from trends as above or directly from the **Machine View** when the trace option has been selected.

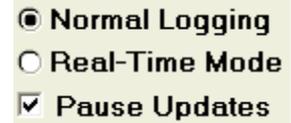
Traces can take several forms including Spectra, Orbits, Time Waveforms and Spectra with Phase. Scalar readings such as temperature, pressure, speed etc. do not have traces associated with them.

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When a trace is selected, if this is the current trace, it will update as readings are received. If it is an historical trace, the **Freeze** control will have a check mark in it and the trace will not update. If the check mark is removed, the screen will update when the next reading is received to show the current trace.

Real Time Traces

Fast trace updates can be achieved by pressing **Real Time Mode** at the bottom of the screen. This option stops logging on other points on the system.



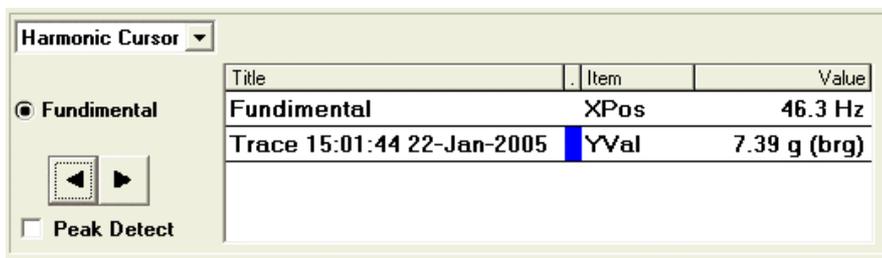
Trace Cursors

A cursor facility is available to assist in analysis. To activate the cursor, you must first select a cursor type. In Spectral Traces, the options are:

- None
- Single
- Dual
- Harmonic
- Sideband

To position a cursor, click with the mouse on a point on the trace.

Each type of cursor has specific cursor readouts associated with it. In the case shown, a Harmonic cursor has been selected. The fundamental frequency is shown, and the spectrum displays cursors at multiples of this frequency.

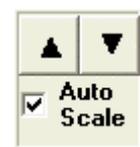


Zooming on Traces

The arrow keys under the description of the cursor type allow movement of the cursor(s) and the vertical arrows allow zooming of the vertical axis scale.

With a check mark in the Auto Scale box, the traces will initially scale automatically to show the highest peak.

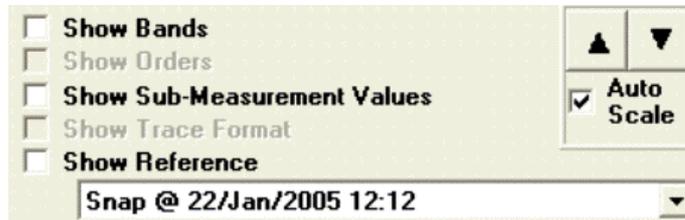
To zoom to any point in a trace, point with the mouse at the trace screen and drag while holding the right mouse button down to select an area. A double click with the left mouse button will return the trace to its un-zoomed condition.



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Trace Options

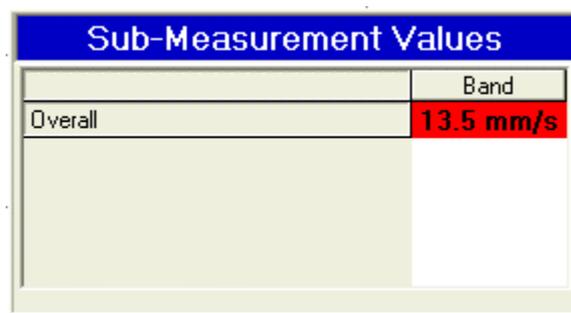
There are several controls positioned together that allow different display options to be chosen for the traces. Not all of the options are available on all systems depending on what measurement types are being employed.



Show Bands will draw lines around each measurement's bands and show the limits applied to each band. If no bands have been set up, the screen may show the limits for the overall measurement.

Show Orders is only available when phase lock loop measurements are made. This then shows the bottom axis in terms of multiples of the machine speed rather than in terms of RPM or Hz.

Show Sub-Measurement Values will indicate the measurement value for each band that has been set up. In this example, no bands were set so only the overall value is indicated.

A screenshot of a window titled 'Sub-Measurement Values'. It contains a table with two columns: 'Band' and a value. The 'Overall' row shows a value of '13.5 mm/s' in a red background.

	Band
Overall	13.5 mm/s

Show Trace Format is only available when the trace display has different display options available. One example of this in the Recip analysis module where Pressure can be displayed versus angle or versus volume.

Show Reference will display a reference trace simultaneously with the current trace. A reference trace is any trace with a name. Traces can be given names by using the **Title** button at the bottom left of the Trace screen, or for a snapshot, by using the **Save** button in the same position.



Current Events

The **Current Events** popup will appear when the **Events** button is pressed. It will also appear when any new alert or alarm is seen by the system.

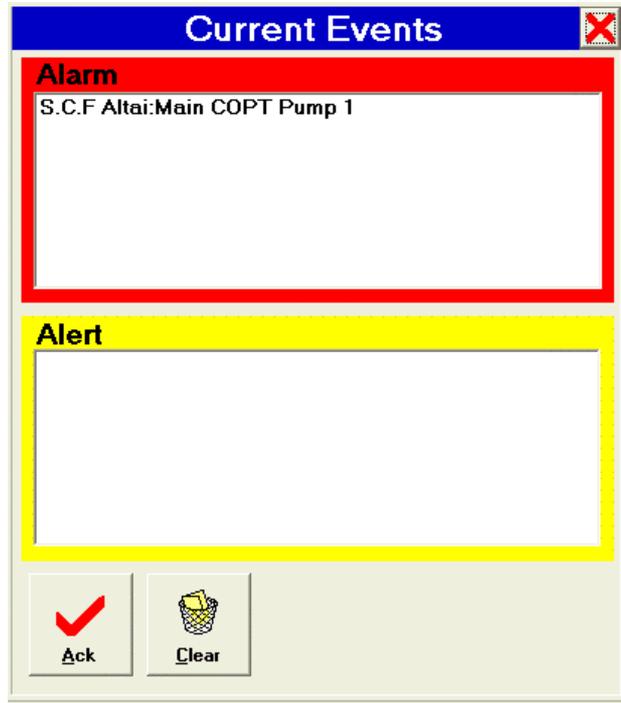
Events can be acknowledged using the **Ack** button. Each entry will then



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have (Ack) placed after it.

Events can be cleared using the **Clear** button providing the event is no longer current. If the point concerned is still in alert or alarm, the entry will not be cleared.

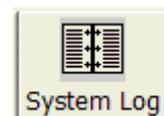


To go straight to the Machine View for a point, double click on its entry in the **Current Events** box.

System Log

Clicking on the **System Log** button accesses the system log.

This log contains information on the events that have occurred. This includes the start and stop times for the programme, Alert and Alarm entry and exit and Acknowledgement times.



It is possible to search this log by text or by date.

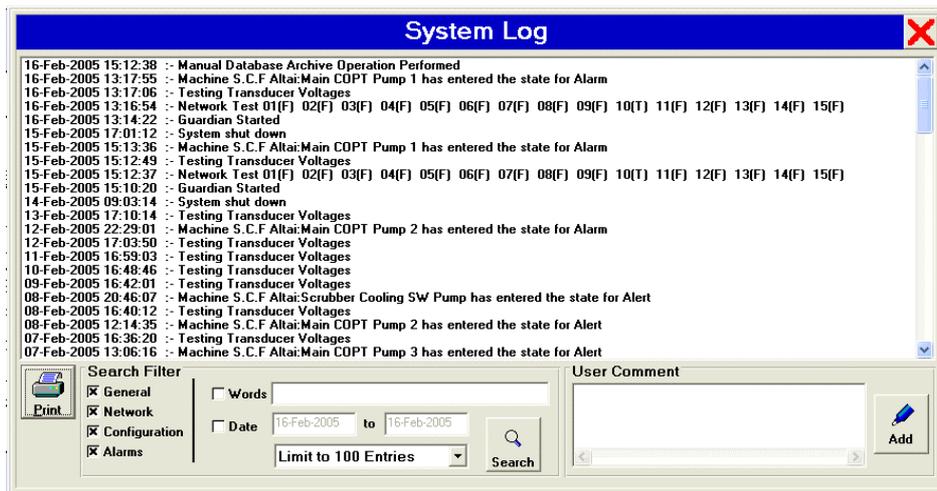
To search for words, put a check mark in the **Words** check box. To search for a date, put a check mark in the **Date** check box. It is possible to search for date and for words at the same time.

Searches can be filtered depending on what information is required. The choices for the filter are: **General**, **Network**, **Configuration** and **Alarms**.

After selecting the search parameters, click on **Search** to initiate the search.

Comments may be added to log entries using the **User Comment** notepad at the bottom right. When the comment has been compiled, press the **Add** button to enter it into the log.

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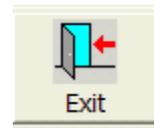
Log entries can be printed out using the **Print** button.

Main Screen Control Buttons

The buttons and drop down menus on the main screen lead to further facilities in Guardian.

Exit Button

This terminates the programme.



Snapshot Button

This will take a complete set of readings from all measurements and store them in the database with the current time and date.



Print Button

This prints the current screen.



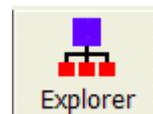
Top Level Button

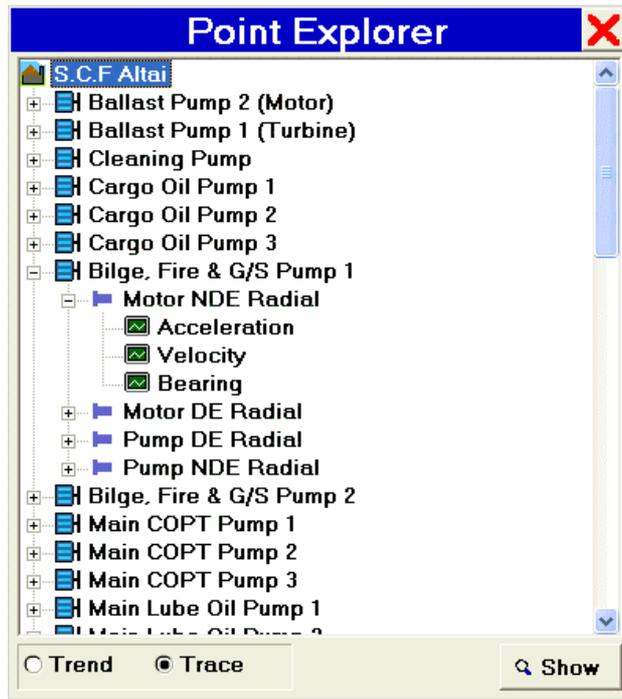
This returns the user to the main mimic screen from any other screen in the programme.



Explorer Button

This brings up a **Point Explorer** dialogue from which trends or traces for individual points can be selected as an alternative to selecting them from the mimics.





The **Point Explorer** operates in a similar way to Windows Explorer. The branches can be expanded or contracted by double clicking on the description or by single clicking on the box with a + or – sign. The final level is the measurement and this only has a description. Double clicking on this or clicking on the **Show** button at the bottom right will take you to the trace or the trend for that measurement, depending on which of the radio buttons at the bottom left is selected.

Logging Start / Stop Buttons

The measurement scanning process can be started and stopped using the **Log** and **Stop** buttons. Logging status is shown at the bottom of the screen.



CHAPTER 2 Adjusting Your Preferences

Security

The security within Guardian is to permit or deny access to various functions in the programme.

This security is provided for the benefit of users who wish to restrict access to authorised personnel for changes within Guardian. There are two levels.

Level 1 allows changes to the Measurement Configurations and System Preferences.

Level 2 allows changes to the Database Management functions.

Security access is normally provided via a floppy disk but alternative methods are possible. When using a floppy disk, it is first inserted into the A: drive of the computer and the **Security** button is then pressed.



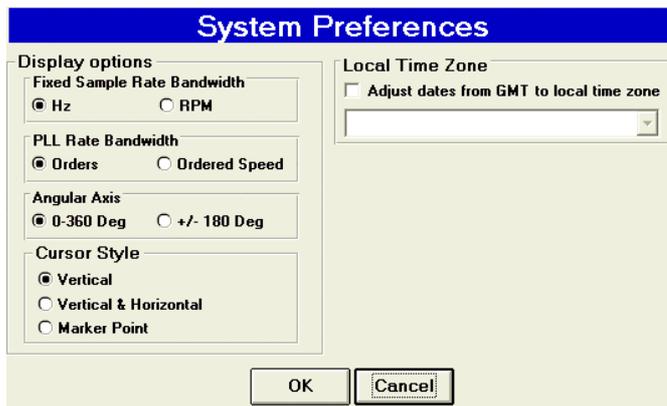
Configure

The system can only be configured by someone who has security to level 1. Press the **Configure** button and there is a choice of the configuration level, **System Preferences** or **Configuration**.



System Preferences

On pressing the **System Preferences** button, changes can be made that apply to the whole system.



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The **Local Time Zone** option is used by shipping operators as the plant may move through time zones. Data is logged using the PC clock. With a check mark in the *Adjust Dates from GMT to local time zone*, the local time zone may be chosen from the drop down list to any zone in the world.

The **Display options** allow alteration of the way information is presented.

Traces can show frequency relative to **RPM** or to **Hz**.

When **PLL** is used (Phase Locked Loop), there is the choice to display either **Orders** or **Ordered Speed**.

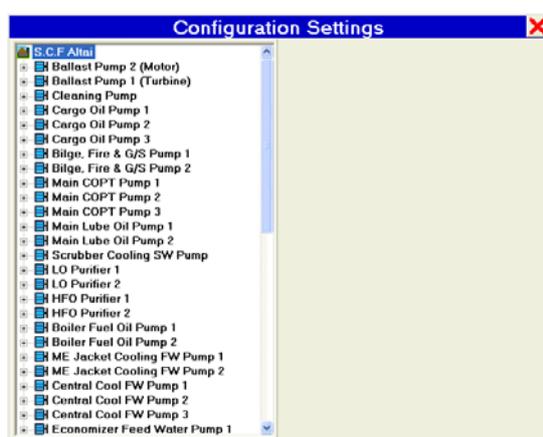
If angular axes are used, there is a choice of displaying **0-360 Deg** or **+/-180 Deg**.

Cursor Style offers a choice of cursor types.

Make the selections and press OK to activate them.

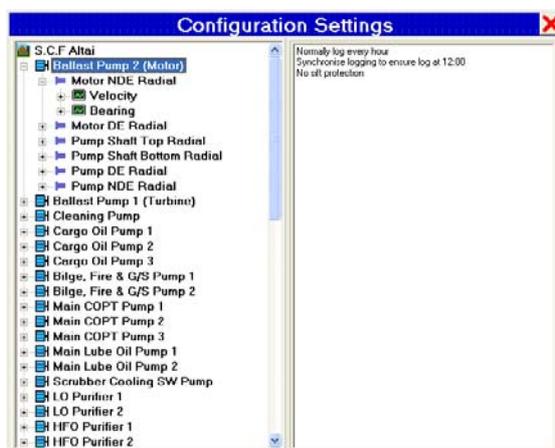
Configuration

The configuration settings may be altered on a point by point basis.



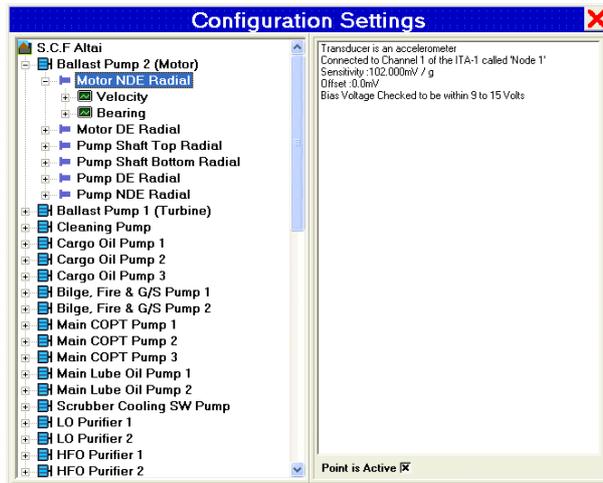
On selection of Configuration Settings, the Point Explorer will be presented. Initially, a view of all the machines in the plant will be displayed, and further detail can be obtained by clicking on the + sign next to each entry.

At the Machine level, the settings for logging of information from the machine are displayed. There are no alterations possible at this level.

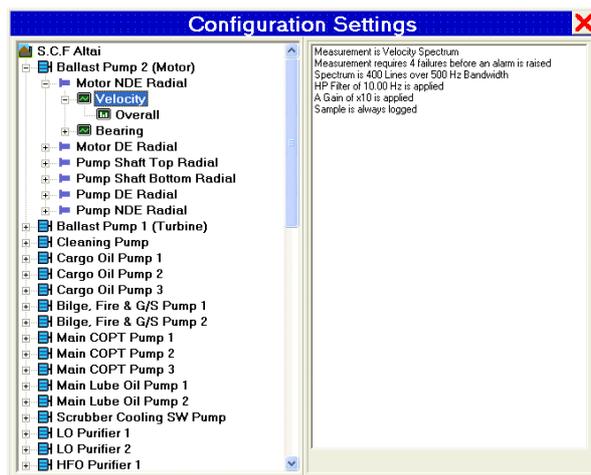


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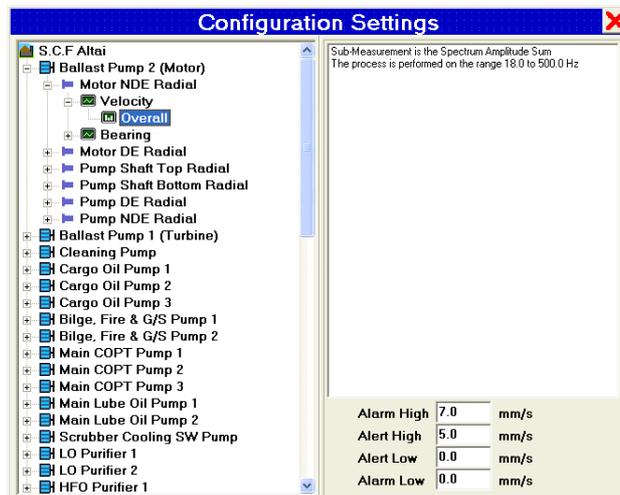
At the point level, it is possible to inhibit a reading by removing the check mark from the **Active** check box. No other alterations are allowed at this level.



At the measurement level, the parameters used to capture the measurement are displayed. It is not possible to make alterations at this level.



At the Band level, it is possible, with security clearance, to alter the Alert and Alarm levels for the chosen reading. No other alterations are possible at this level.

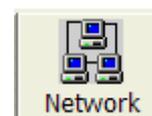


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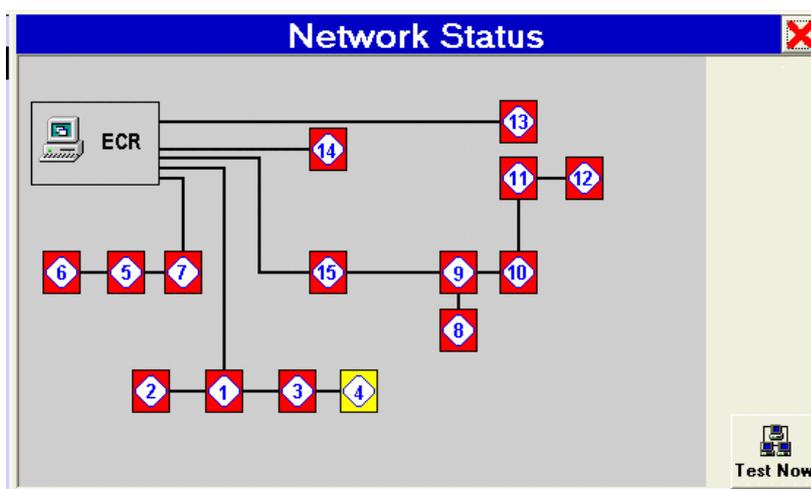
CHAPTER 3 Maintaining the System

Checking the Network

The system makes an automatic network check on start-up and a display will appear telling the operator what the status is. Pressing the **Network** button show the current network status



Nodes that are operating properly will appear green initially.



Clicking on a node in the schematic will bring up a pop up window showing the bias voltages for each channel. Normal bias voltages are around 10V but this depends on the sensors used. An short circuit is shown by a very low voltage and an open is shown by a voltage over 20V.

Node 192.168.101.154			
ITA-1 Issue C [Node 4] Node has failed transducers Last detected at 15:20:36 16-Feb-2005 Last data sampled at 15:20:36 16-Feb-2005 Configured at 11:49:33 22-Jan-2005			
Transducer Voltage Check			
1= 8.2 V	5= 0.3 V	9= 0.3 V	13= 0.3 V
2 UnTested	6= 0.3 V	10= 0.3 V	14= 0.3 V
3= 20.7 V	7= 0.3 V	11= 0.4 V	15= 0.3 V
4 N/A	8 N/A	12 N/A	16= 0.3 V

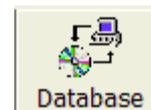
The network may be re-tested at any time by clicking on the **Test Now** button.

Resetting the System

The drop-down menus contain the same functions that are available by using the buttons at the top of the screen with one exception. This is under the **Network ... Reset Nodes** selection. This function re-initialises the system.

Database Management

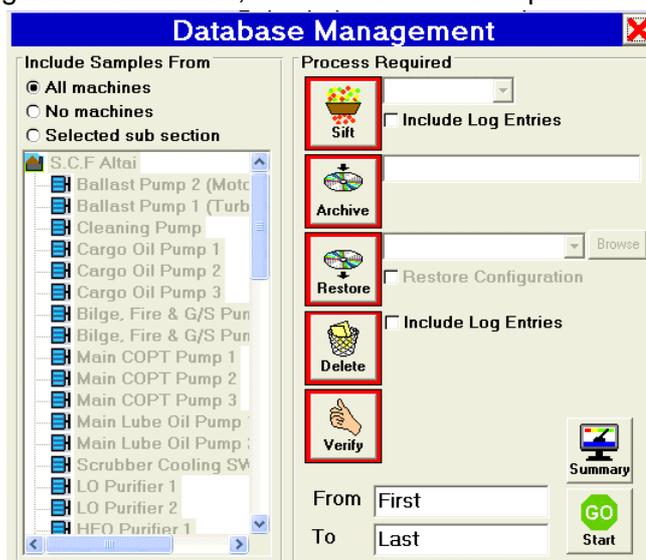
By clicking on the **Database** button, the dialogue for database options is selected.



Manual Options

From here it is possible to perform database **Sift**, **Archive**, **Restore**, **Delete** and **Verify** functions.

The items to be operated on are selected using the tool buttons and the date range at the bottom right. On the far left, the machines to be operated on can be selected.



Sift will retain one value in the period selected. This is a typical value for the period. The choice of interval is made in the drop down list to the right of the **Sift** button. Log entries will only be sifted if the **Include Log Entries** check box is ticked.

Archive will create a backup database. The name of the archive will default to the Guardian systems name followed by the date, however it may be changed as required. The folder containing the archive will be placed into the pre-selected Archives folder.

Restore allows archived data to be reinserted in the database. Note that scheduled sifting will eventually reduce this to the chosen sift settings. The archive folders currently available are listed alongside for selection. The **Browse** button allows a new Archive folder to be selected.

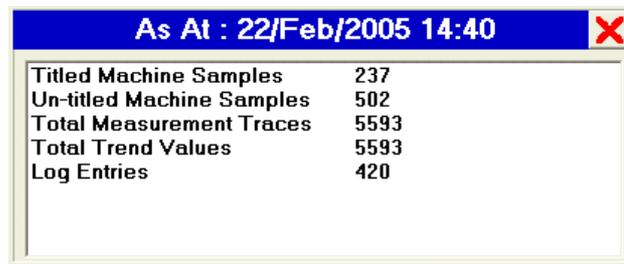
Delete permanently removes records from the database.

Verify checks the integrity of the database and corrects any problems.

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To start the selected operations, press the **Go** button at the bottom right.

The **Summary** button causes the database to be scanned and its statistics presented in a pop up window.



The image shows a pop-up window with a blue title bar containing the text 'As At : 22/Feb/2005 14:40' and a red 'X' close button. The main content area is white and contains a table of statistics.

Titled Machine Samples	237
Un-titled Machine Samples	502
Total Measurement Traces	5593
Total Trend Values	5593
Log Entries	420