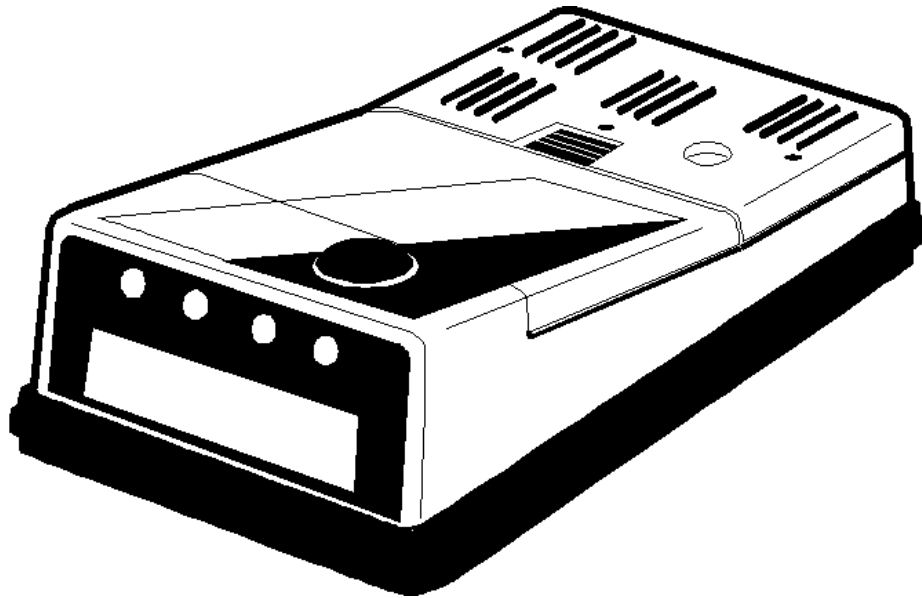


Reference Manual
PhD Ultra
Datalink and Gas Detection Database Software
for Windows



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14JUNE2004 / Version 2.33

P/N: 13-069

WARNING

THE PhD ULTRA PERSONAL PORTABLE GAS DETECTOR HAS BEEN DESIGNED FOR THE DETECTION OF OXYGEN DEFICIENCIES, FLAMMABLE GAS, AND TOXIC VAPOR ACCUMULATIONS.

IN ORDER TO ASSURE THAT THE USER IS PROPERLY WARNED OF POTENTIALLY DANGEROUS ATMOSPHERIC CONDITIONS, IT IS ESSENTIAL THAT THE INSTRUCTIONS IN THE PhD ULTRA REFERENCE MANUAL BE READ, FULLY UNDERSTOOD, AND FOLLOWED.

AVERTISSEMENT: LIRE ATTENTIVEMENT LES INSTRUCTIONS AVANT DE METTRE EN MARCHE.

**Reference Manual
PhD Ultra
Datalink and Gas Detection Database Software
Version 2.33
Copyright 2004
by
Biosystems LLC, A Bacou-Dalloz Company
Middletown, Connecticut 06457**

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Introduction

The PhD Ultra Datalink Kit consists of a copy of Biosystems' Gas Detection and Database Software for the PhD Ultra, a software instruction manual, a dual purpose slip-in fast charger / computer interface "Datadock", and an interface cable used to connect the Datadock to a serial port of the user's IBM compatible computer running **Windows™ 95 or Windows 3.1**.

Biosystems' Gas Detection and Database Software for the PhD Ultra is menu driven for easy use. The software allows your PhD Ultra and your computer to communicate with each other. It serves two basic functions: getting stored information out of the instrument and into your computer, and using the computer to "configure" your PhD Ultra.

Optional instrument setups are created by "filling out" configuration forms displayed by the software. Most functions (such as downloading stored information from the instrument to your PC) are automatic or as easy as pushing a button. The software is designed to help you along.

Once PhD 's session information has been "downloaded" to the computer it may be used for a variety of purposes. Data may be displayed and reviewed in detail through the *Session Summary* form, or used to automatically generate reports, tables, and time history graphs of the session data. It is also possible to export data session records to other software applications in the form of ASCII or "comma delimited" database files. Another option is to simply retain downloaded records as computer files to provide a permanent record of your gas detection monitoring program.

The best way to learn the software is to use it!

Section 1: Installing PhD Download Software

Windows™ 95

To automatically install the PhD Ultra Datalink software using **Windows™ 95**:

1. Insert disk 1 into your floppy drive.
2. Select Start on your Windows™ 95 main menu.
3. Next select Run.
4. Type in a:setup and click on OK.

The PhD software and help file can be accessed using the Biosystems' menu under the Programs menu item in the Start Menu.

Options in the installation program allow for shortcuts to the PhD program to be created directly on the Windows™ 95 desktop or directly on the Start Menu.

Windows™ 3.1

To automatically install the PhD Ultra Datalink software using **Windows™ 3.1**:

1. Insert disk 1 into your floppy drive.
2. Select **File in the Windows™ 3.1** Program Manager.
3. Next select **Run**.
4. Type in **a:setup** and click on **OK**.

This will start the installation program for the PhD Ultra datalink software. An icon will be created for easy access to the PhD program and the Help file.

Note: If some of the text displays in the software appear shifted to the left, it may be necessary to install the MS Line Draw font.

To install the font in Windows™ 95, use the Start Menu and select Settings and then Control Panel. Next, 'double-click' on the Fonts icon. Select the File menu and the item Install New Font. The new MS Line Draw font file (Linedraw.ttf) is located in the \Program Files\WinUltra directory.

To install the font in Windows™ 3.1, use the Control Panel program group to access the Fonts program and select Add. The new MS

Line Draw font file (Linedraw.ttf) is located in the WINULTRA directory.

Section 2: Using PhD Ultra Datalink Software

2.1. General

The PhD software's Main menu lists four items: **File**, **Instrument**, **Computer**, and **Help**.

The **File** menu is used to save session data files, delete unwanted session data files, and exit the PhD program.

The **Instrument** menu is used to perform such tasks as instrument configuration (i.e. changing alarm levels, instrument feature settings, etc.), downloading session data, or clearing information stored in the datalogger memory which is unwanted.

The **Computer** menu allows selection of the communication port and speed for connection to the PhD Ultra data dock and the PC.

The **Help** menu displays software version, software creation date and Biosystems technical support number.

2.2. Using menus

To access any menu, either use the mouse to click on the menu heading or simultaneously press <Alt> and the Underlined letter in the heading. For example, to

access the **File** menu on the Main PhD menu, press <Alt> key then type "F". To select an individual menu item, simply use the mouse or type the underlined letter. When selecting a item from a menu, don't press the <Alt> key.

2.3. Using "command buttons"

Some forms will display "command buttons". (See Appendix A). Simply move the mouse cursor over the "command button" and click.

2.4. "Print" command button

Several forms (for instance *Configuration* or *Session Summary*) include a "**Print**" command button at the bottom of the form. The print command button may be used to print a form's contents. The printouts will be provided in a pre-formatted report.

When a "**Print**" button is selected, a pop up *Printer Setup* form will indicate printer choices.

Verify that the correct printer and settings are selected and click on "**OK**" to print a copy of the pre-formatted report.

2.5. Transferring PhD data

When you are ready to upload or download data to the instrument:

1. Turn the PhD Ultra off and place it in the Datadock.
2. Connect the interface cable from the Datadock to the appropriate serial port of your PC (COM 1-4). Computer setup choices (such as which serial port to use) are made while in the **Computer** menu described in **Section 5.1**.
3. Select the appropriate item from the **Instrument** menu ("**Configuration**" or "**Download Data**").

Please Note: The Communication setting in the PhD Ultra and in Computer Setup must be set to the standard communication rate when running Windows™ 3.1.

Section 3: Using the File Menu

3.1. General

Menu choices on the **File** menu are used to review or print reports of previously downloaded information, delete unwanted session data files, and exit the PhD program.

3.2. Open Item

The "**Open**" item from the **File** Menu is used to retrieve previously stored session data files.

The File dialog box will list all available ".PhD" data files stored in the current directory. The file dialog also allows you to change directories to review ".PhD" data files stored in other locations. Select the file to open by clicking on the file name in the list and selecting "**OK**".

After the file is loaded, the data can be used the same as a new session downloaded from the instrument. The loaded data can be graphed, displayed in a data table, or used to create reports, enter session comments or export data to a file for use in spreadsheet programs.

3.3. Delete Item

The "**Delete**" item is used to delete ".PhD" data files from your computer hard drive.

The Delete dialog box will list all available ".PhD" data files stored in the current directory. Select the file for deletion by clicking on the file name in the list and selecting "**OK**".

Note: Make sure you have no further use for a file before deleting! Once the file has been deleted it is no longer available for any further use.

3.4. Exiting PhD Ultra Datalink Software

Use the "**Exit**" item to exit the PhD Datalink software.

Section 4: Using the Instrument Menu

4.1. General

The PhD Ultra automatically stores gas readings, as well as other important information such as session start and end times, session duration, internal temperatures, battery voltage, and a history of the instrument's calibrations.

The PhD Ultra can store the exposure values for up to 3600 data intervals. Given a 1 minute datalogging interval, this is enough for the storage of up to 60 hours broken into as many as 45 monitoring "sessions". Using a longer datalogging interval increases the length of monitoring time for which data may be stored.

For instance, if a datalogging interval of two minutes is selected, then instead of 60 hours, 120 hours of monitoring data may be stored. Selecting datalogging intervals and other instrument configuration choices are performed by adjusting "Datalogger Settings" in the "Configuration" screen. (See section 4.3.)

Datalogging is a "transparent" function; that is, it is not necessary to do anything special to begin logging data. Simply turning on the PhD Ultra causes it to begin recording data.

The *Instrument* menu contains three options: "Download Data", "Configuration", and "Clear Memory".

4.2. Downloading PhD Ultra Data

Use the following procedure to download data from the PhD Ultra to your personal computer:

- (1) Connect the interface cable from the Datadock to the appropriate port of your PC.
- (2) Make sure the instrument is turned off.
- (3) Insert the PhD Ultra into the Datadock.
- (4) elect "**Download Data**" from the *Instrument* menu
- (5) Select the "**OK**" button when ready.
- (6) The Datalink Software will automatically turn the PhD Ultra on and initiate the data transfer.

4.2.1. Saving Session data

During data transfer the Processing Monitor will display the percentage of data currently in the instrument memory which has been downloaded to the PC. When data transfer is complete select the "**Save to File**" button on the *Instrument Summary Information* form to save the information to the hard disk.

4.2.2. Instrument Summary Information form

The *Instrument Summary Information* form lists the individual monitoring sessions which can be selected for detailed examination. The information includes start time, stop time, user name and location for each session.

See Appendix A Figure 3.1

4.2.3. Session Summary Information form

Select the "**View Data**" button from the *Instrument Summary Information* form to examine a data session in detail. The *Session Summary Information* form displays Session Duration, Start and Stop Times of the session, Datalogging Interval, Peak and Low Temperatures, User ID, and Location Description. The form will also display Summary Data for each individual sensor. This information includes Sensor Type(s) installed, Sensor Serial Number(s), Peak and Low readings for that data session, Peak STEL, Last TWA, and dates of the Last Zero and Span Calibrations.

At the bottom of the form is a series of command buttons which include "**Alarms**", "**View Graphs**", "**Graph Options**", "**View Table**", "**Print**", "**Next >>**", "**<< Previous**", and "**< Back**". See Appendix A Figure 3.2

4.2.4. Alarms button

The "Alarms" button will display the alarm settings configuration for the 4 sensors during datalogging of the current session.

4.2.5. View Graphs button

One the most useful ways of reviewing session data is to examine the data in the form of a time-history graph. Time-history graphs are generated by plotting gas reading values

registered during the monitoring session against time.

Use the “**View Graphs**” button to display time history graphs for all sensors (up to 4) which were installed in the PhD Plus at the time the session data was recorded.

Each of the time history graphs will be fitted into a quadrant of the Graph form. Each graph is identified by sensor type. These graphs are generated by seizing the peak reading registered during each datalogging interval and plotting it against time. If an oxygen sensor is installed then the minimum reading during the datalogging interval is plotted on the graph. It is also possible to plot both the peak and minimum oxygen reading during each interval period on the graph.

See Appendix A Figure 3.3

Select **Graph Options** button to modify the graph’s appearance by using “**Graph Type(s)**”, “**Scaling**”, “**Grid**”, “**Thickness**” and “**Color**”.

The “**Graph Type(s)**” tab allow the “**Peak**” or minimum in the case of Oxygen, “**STEL**” and “**TWA**” line graphs to be “toggled” on and off. You can also select an option to view the peak O2 readings. The “**Scaling**” tab allows you to scale the graphs to the alarm settings or to the Max. Peak data point. The “**Grid**” tab allows the *Tick*, *Grid* and *Line* styles to be selected. The “**Thickness**” tab allows the width of the graph line to be selected. The “**Color**” tab defines the graph to be in Color or Monochrome. See **Appendix A Figure 3.4**

Each graph shows readings registered throughout the entire monitoring session, compressed to fit into the available monitor screen space.

It is possible to enlarge a graph to the full size of the screen by using the “Full Size” item in the **Graph** menu and selecting the desired graph.

A graph can be viewed in greater detail by selecting the “**Zoom**” item from the **Graph** menu and moving the mouse to a selected area to “zoom”. Then use the left mouse button to “click” and “drag” a window over the area. After the mouse button is released, the graph will expand

to the “zoomed” area. A graph can be zoomed in normal and full size view.

The “**Restore**” menu item will return all graphs back to their original states.

4.2.6. Data Table Button

Choose the “**View Table**” button from the *Session Summary Information* form to display data in the form of a tabular chart. Each line of the table represents values registered during a specific datalogging interval. The parameters displayed in each line are: run time, time of day, oxygen concentration (if applicable), LEL concentration (if applicable) and readings for up to two toxic sensors. Besides showing the peak toxic concentration readings for each datalogging interval, a STEL and TWA value are also logged (when applicable) for each sensor. Each line also includes the battery voltage and instrument temperature for that data point. An Alarm condition is represented by “*” at the end of the value exceeding the alarm setting.

The program will load the first 200 available session data points into the data table.

Use the “**Top**” button to move to the top of the list and the “**Bottom**” button to move to end of the list. If the data session is greater than 200 points, use the “**Next 200>>**” button to move down the list 200 points and “**<<200 Prev**” to move up the list 200 points. The total number of session data points is displayed in the lower right corner of the data grid.

The “**Print**” button may be used to send the contents of the current form of information being viewed directly to a printer.

Select “**File Export**” button to export the data to an ASCII comma delimited file format for use in a spreadsheet program.

See Appendix A Figure 3.5

4.2.7. Next / Previous session buttons

The “**Next / Previous Session**” command buttons are used to leave the session currently being viewed, and switch to the next or previous monitoring session on the session list.

4.2.8. Print button

The “**Print**” command button sends the session summary information directly to a printer.

4.2.9. Back button

The “**Back**” command button returns to the *Instrument Summary Information* form.

4.3. Configuring the PhD Ultra

After selecting “**Configuration**” from the *Instrument* menu, you will be prompted to connect the RS-232 cable from the Datadock to the computer, and to select “**OK**” when completed. The software will “wake up” the PhD Ultra and automatically initiate communication.

The *Processing Monitor* will provide a series of dialogue boxes showing the progress of communication between the instrument and computer.

After the download is complete, the *Configuration Settings* form will be displayed.

4.3.1. Alarm Tab

The “*Alarm*” tab on the *Configuration Settings* form

enables you to adjust alarm settings for all sensors installed in the unit. Adjustable items include: High and Low Oxygen Alarms, LEL Ceiling Alarm, and Ceiling, STEL and TWA alarms for each toxic sensor. **See Appendix A Figure 2.1**

4.3.2. Datalogger Tab

The “*Datalogger*” tab on the *Configuration Settings* form enables you to adjust the datalogger interval, change the Current User and Location ID, or change the Instrument Date and Time. **See Appendix A Figure 2.2**

4.3.3. Features Tab

The “*Features*” tab on the *Configuration Settings* form is used to change the Current Operating Mode, Alarm Latch, enable the “**OK**” alarm latch, assign (and specify an interval for) a timed security beep, or change the precision of the toxic sensor readout from increments of 1.0 ppm to 0.1 ppm. If the Alarm Latch is enabled, the alarm once activated will continue to sound until

the instrument is manually reset **See Appendix A Figure 2.3**

4.3.4. Auto Calibration Tab

The “*Auto Calibration*” tab on the *Configuration Settings* form is used to alter the concentration values for calibration gas used in the automatic calibration sequence. Installed sensors are listed, and next to each is an edit box into which you may type the gas concentration.

If one of the sensors is a “*CO Plus*” sensor you will have the additional choice of indicating whether the sensor is to be calibrated to carbon monoxide or hydrogen sulfide. A check box is provided to indicate your choice. Please note that if a change is made to the type of gas used to calibrate your CO Plus sensor, the alarm settings will automatically be altered to reflect the new hazard. **See Appendix A Figure 2.4**

Note: Incorrect assignment of the type or concentration of gas that will be used by the instrument during auto calibration procedures may result in dangerously inaccurate readings. Verify the concentration and type of calibration gas that will be used before making any changes!

4.3.5. Sensor Info. Tab

The “*Sensor Info*” tab on the *Configuration Settings* form is used to assign a Service Due date for each individual sensor. This form will also display the sensor serial number and the warranty expiration date. Since this information is written directly to the sensor EEPROM, the assigned service due date will remain in effect even if the sensor is removed from one instrument and installed in another. **See Appendix A Figure 2.5**

4.3.6. Calibration History Tab

The “*Calibration History*” tab on the *Configuration Settings* form will display the last 8 fresh air and span calibration dates for each sensor. **See Appendix A Figure 2.6**

4.3.7. User/Location Tab

After selecting the “*User/ Location*” tab on the *Configuration Settings* form, the current location setting and a list of up to 15 additional location

selections will be displayed. The current User ID is also displayed along with a list of up to 10 additional User ID selections. Once these lists are entered into the instrument memory, they can be selected and used to “tag” a monitoring session with user and location information at any time while the instrument is being used in the field. Instructions for using the instrument push-buttons to select a new location or user ID from the lists in memory are given in **Section 4.5.5.2** of the PhD Ultra reference manual.

To modify a Location or User ID simply move to that field using the mouse or the keyboard and type in the new setting. Any sequence of up to 14 alphanumeric characters are allowed for each entry.

4.3.8. Uploading New Instrument Configuration

When you have finished editing the instrument’s configuration, select the “**Upload**” command button to upload the new information.

4.3.9. Canceling Configuration Changes

To cancel changes in the configuration, press the “**Cancel**” command button. The software will return to the PhD’s main menu.

4.4 Clear Datalogger Memory

When you select this option from the **Instrument** menu, a pop-up question box will appear which asks “Clear the Contents of the Datalogger?” If you select “**Cancel**” then you will be returned to the main menu. If you select “**OK**” then you will be instructed to connect the RS-232 cable from the Datadock to the computer, and to select “**OK**”. All recorded session data currently in instrument memory will be cleared, and you will be returned to the PhD’s main menu.

Make sure that any session information which will be needed later is safely downloaded and stored prior to clearing the instrument memory. Once session data has been cleared it is permanently lost to future use!

Note: This procedure only clears data recorded during monitoring sessions. Configuration settings, such as Alarm Settings are not affected by this procedure.

Section 5: Using the Computer and Help Menus

5.1. Computer Menu

Select the “Communication Setup” item from the **Computer** menu item to specify the serial communications port (COM 1-4) and the communications rate that will be used during PhD data transfer. **Communication speed** selections are available for Windows 3.1 and Windows 95. **See Appendix A Figure 4.1**

5.2. Help Menu

The Help Menu is designed to provide “on-line” assistance to the user during operation of the PhD Download Software.

While using the “on-line” help, the user can search for a topic by entering a key word. Each topic can be send to the printer for a hard copy and the help can be navigated by using several command buttons to move forward and backward through the list of topics.

5.2.1. Contents

This menu item provides instant access to the table of contents of the help file. Use the section links in green to access a topic.

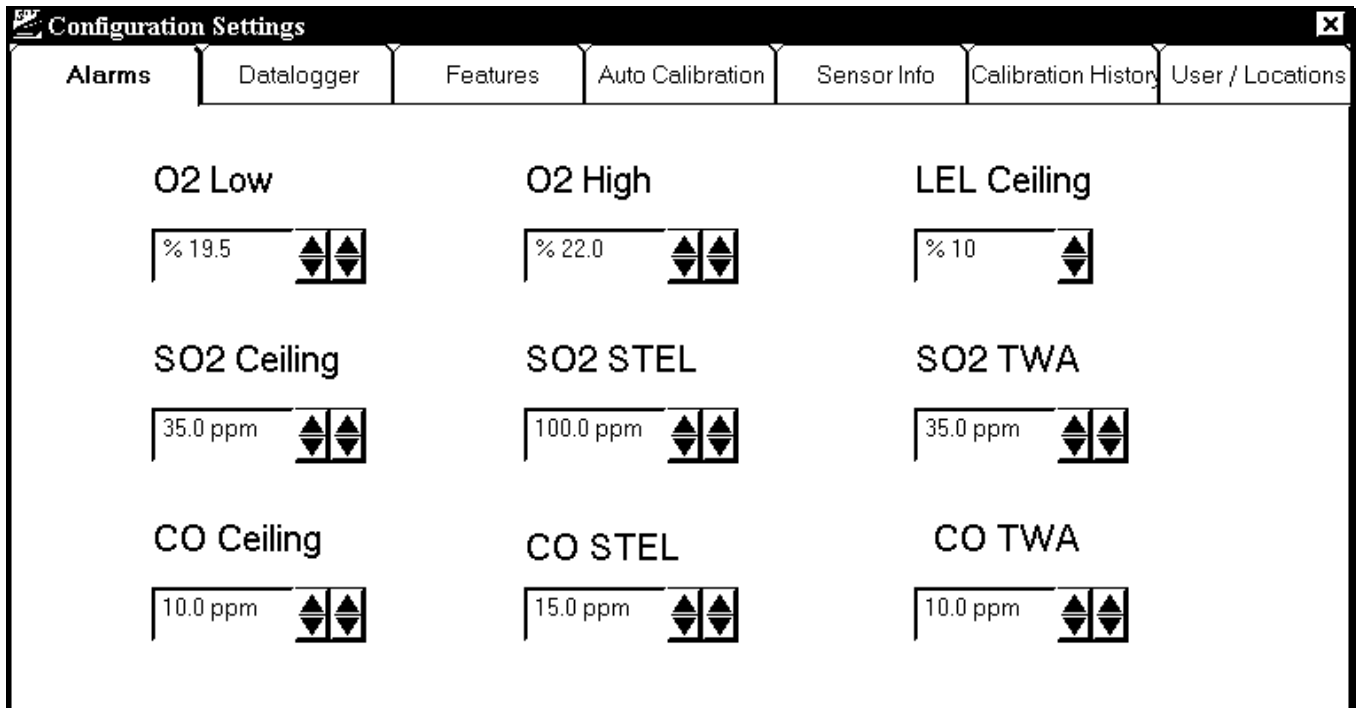
5.2.2. Search For

Use the Search For menu item to enter a keyword and subject name to find. The list will automatically update to find a match on the entered text. Once the subject or keyword is found, “double-click” the item and help file will move to the selected topic.

5.2.3. About Phd Ultra

Select the “About PhD Ultra” item from the **Help** menu to find out the Software Version, Software Date, and Biosystems’ Technical Support phone number.

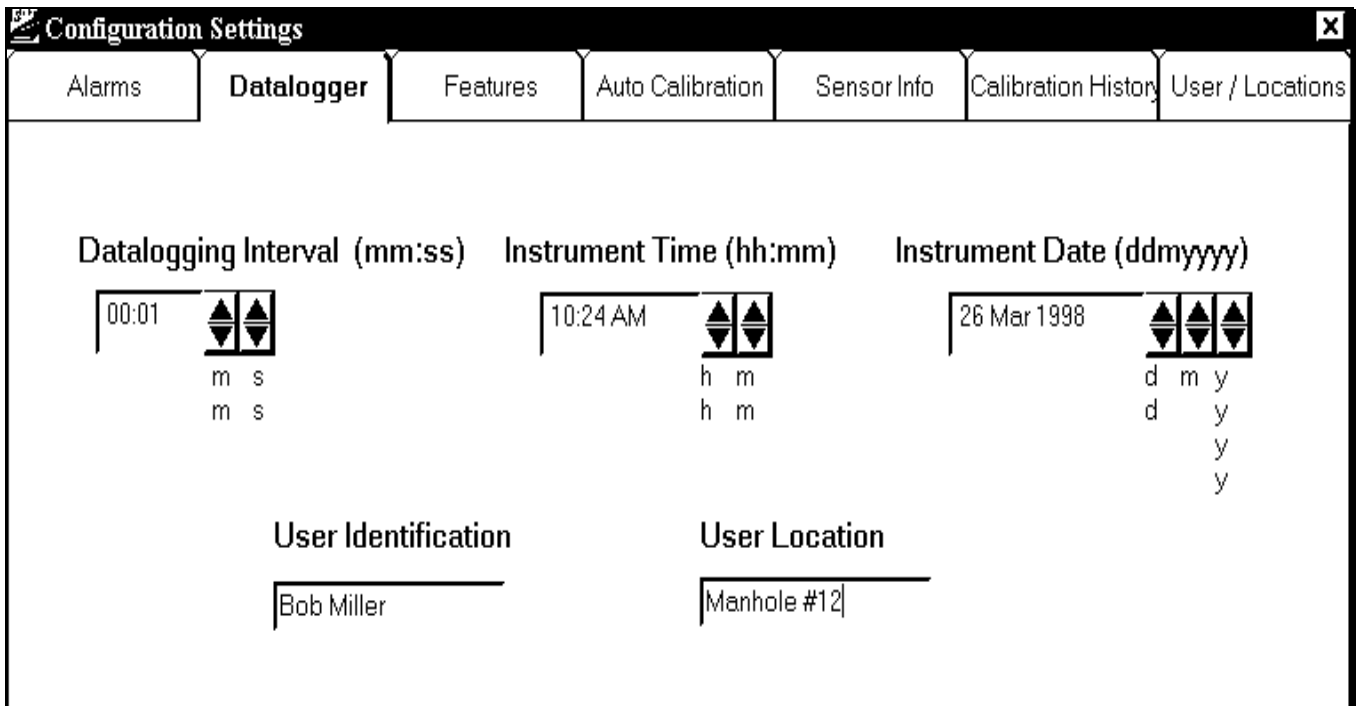
Appendix A: Examples of forms, reports, and time history graphs



The screenshot shows the 'Alarms' tab in the 'Configuration Settings' window. It features a grid of nine alarm settings, each with a label, a numerical value in a text box, and a spin button. The settings are: O2 Low (19.5%), O2 High (22.0%), LEL Ceiling (10%), SO2 Ceiling (35.0 ppm), SO2 STEL (100.0 ppm), SO2 TWA (35.0 ppm), CO Ceiling (10.0 ppm), CO STEL (15.0 ppm), and CO TWA (10.0 ppm).

Parameter	Value
O2 Low	19.5%
O2 High	22.0%
LEL Ceiling	10%
SO2 Ceiling	35.0 ppm
SO2 STEL	100.0 ppm
SO2 TWA	35.0 ppm
CO Ceiling	10.0 ppm
CO STEL	15.0 ppm
CO TWA	10.0 ppm

Figure 2.1 - Configure Alarm Settings



The screenshot shows the 'Datalogger' tab in the 'Configuration Settings' window. It contains three main settings: Datalogging Interval (00:01), Instrument Time (10:24 AM), and Instrument Date (26 Mar 1998). Below these are two text input fields for 'User Identification' (Bob Miller) and 'User Location' (Manhole #12).

Setting	Value
Datalogging Interval (mm:ss)	00:01
Instrument Time (hh:mm)	10:24 AM
Instrument Date (ddmmyyyy)	26 Mar 1998
User Identification	Bob Miller
User Location	Manhole #12

Figure 2.2 - Configure Datalogger Settings

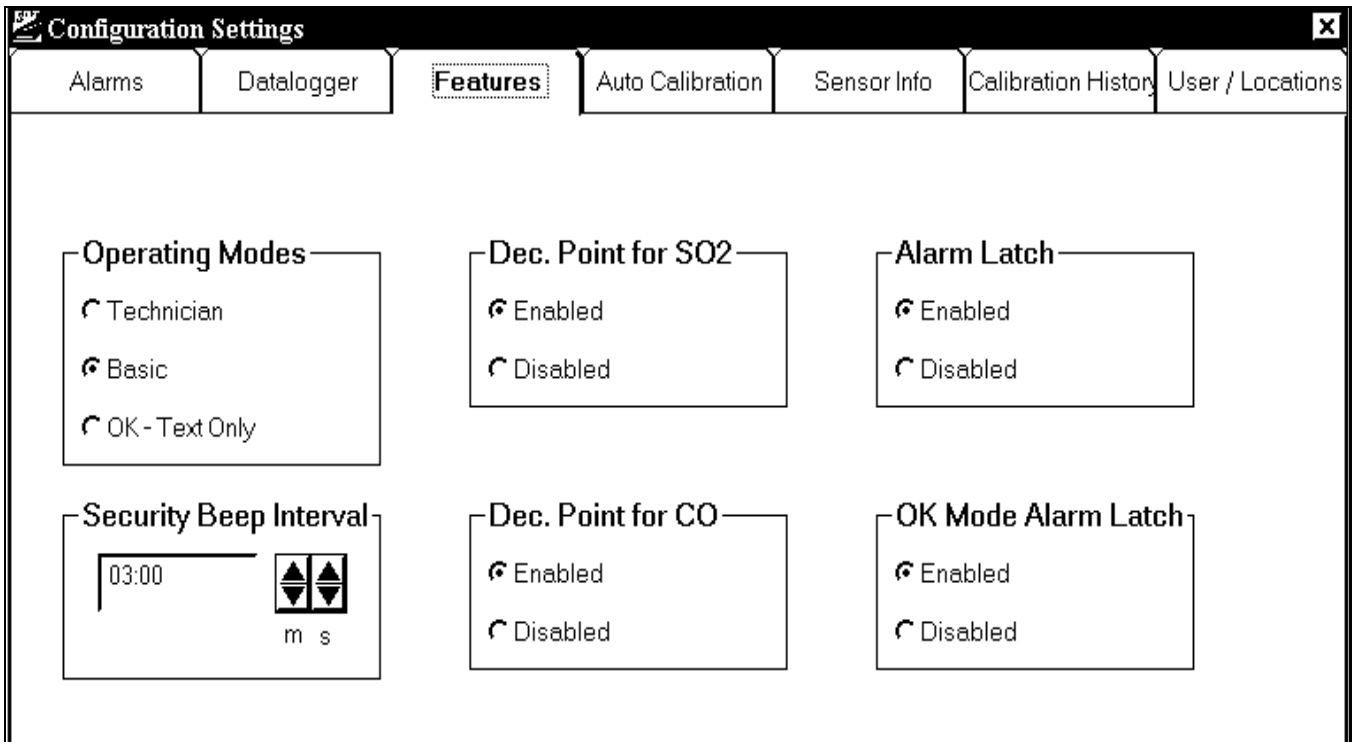


Figure 2.3 - Configure Feature Settings

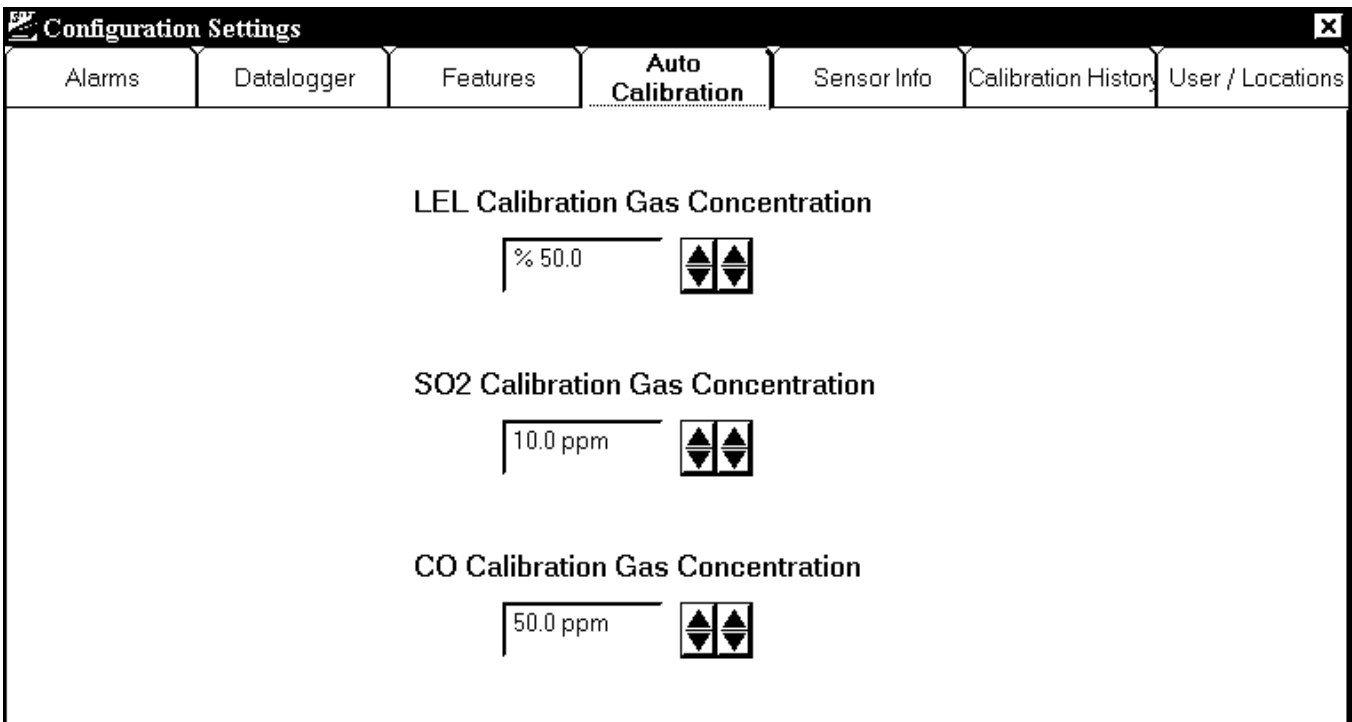


Figure 2.4 - Configure Auto Calibration Gas Settings

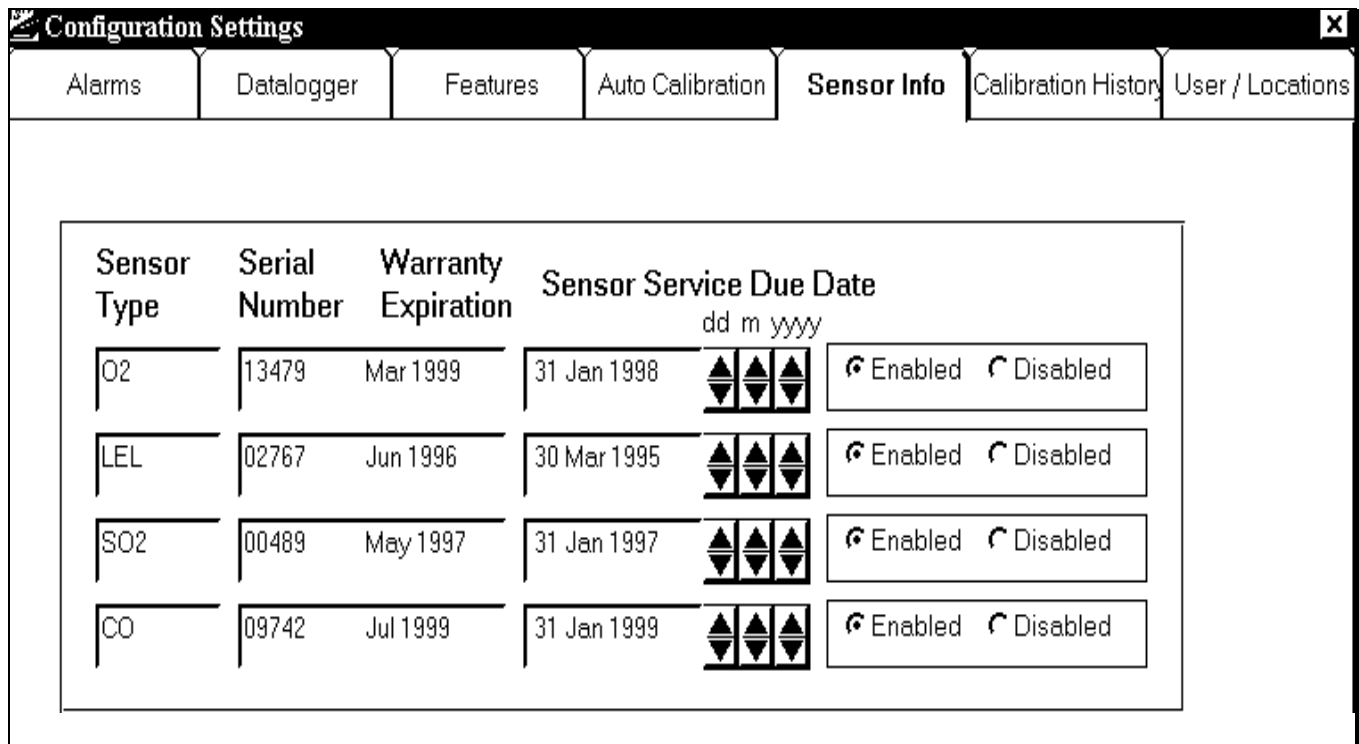


Figure 2.5 - Configure Sensor Service Date

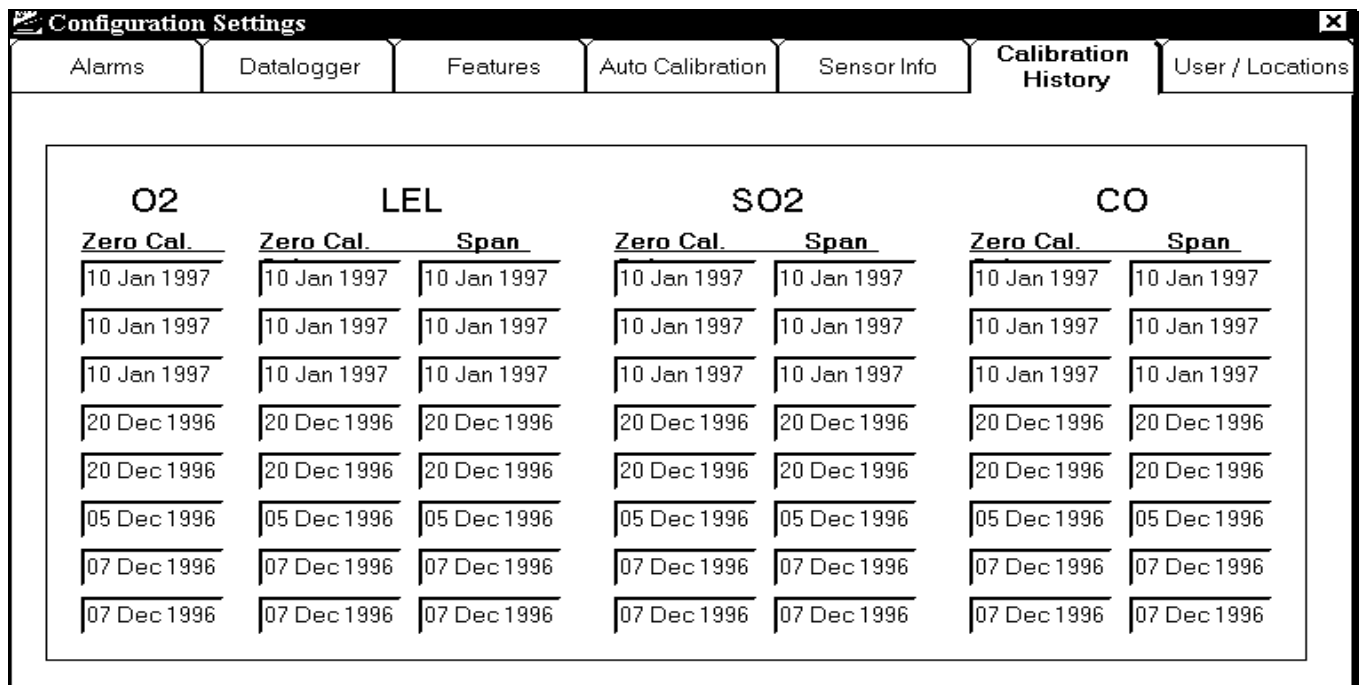


Figure 2.6 - View Sensor Calibration History

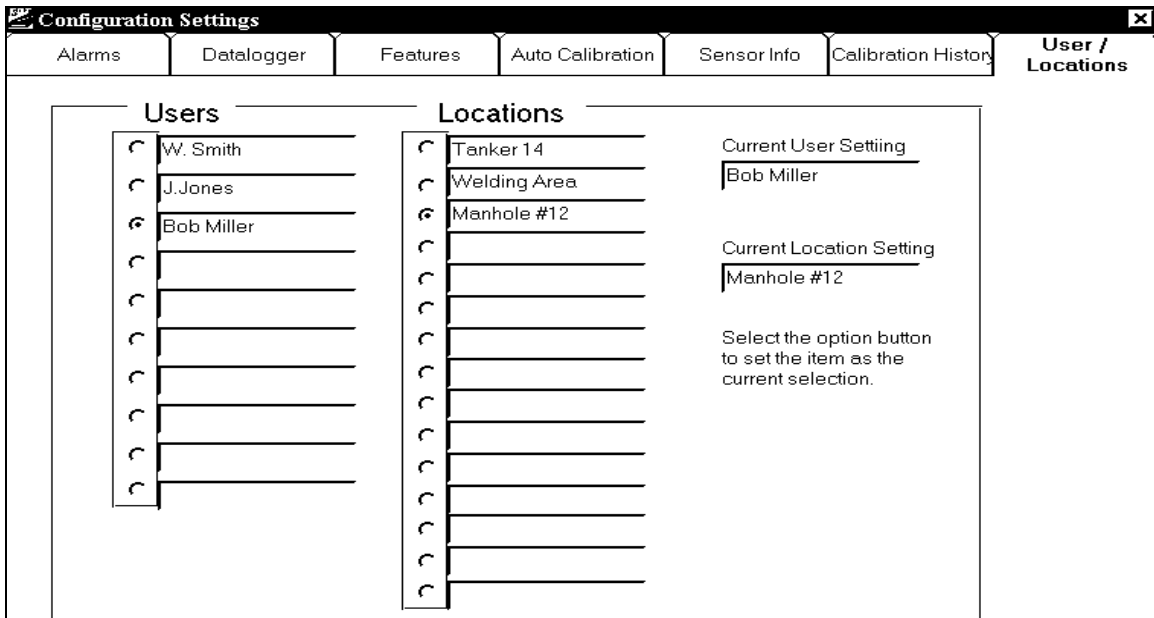


Figure 2.7 - Configure User and Location Lists

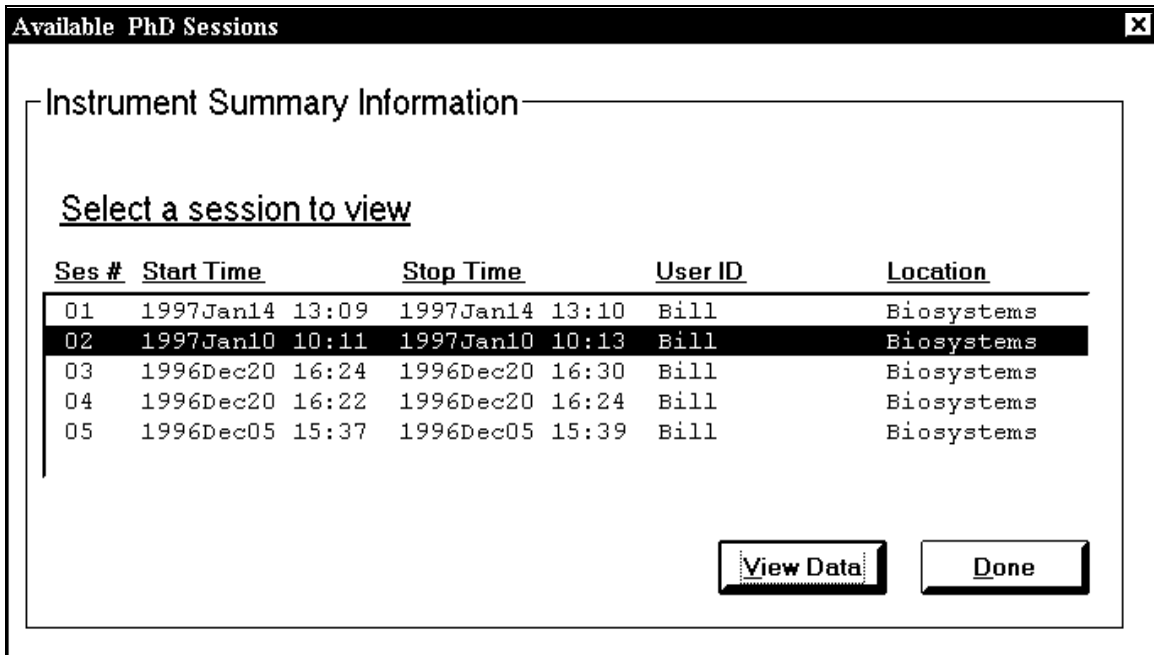


Figure 3.1 - Instrument Session Summary Form

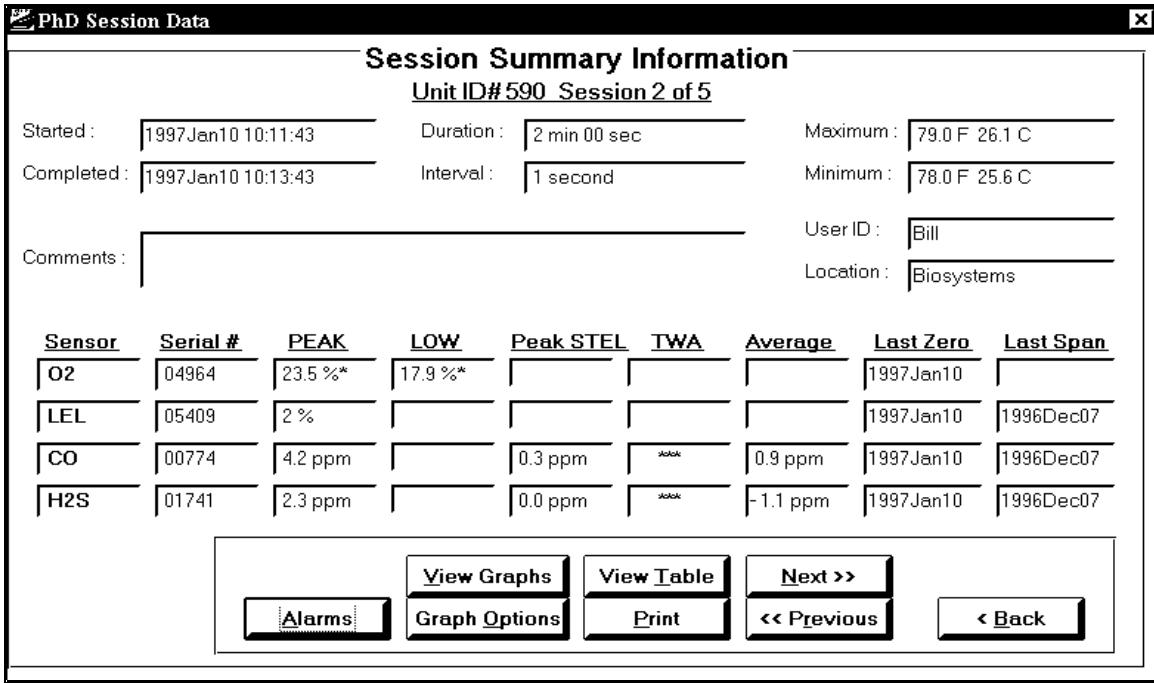


Figure 3.2 - Session Summary Form

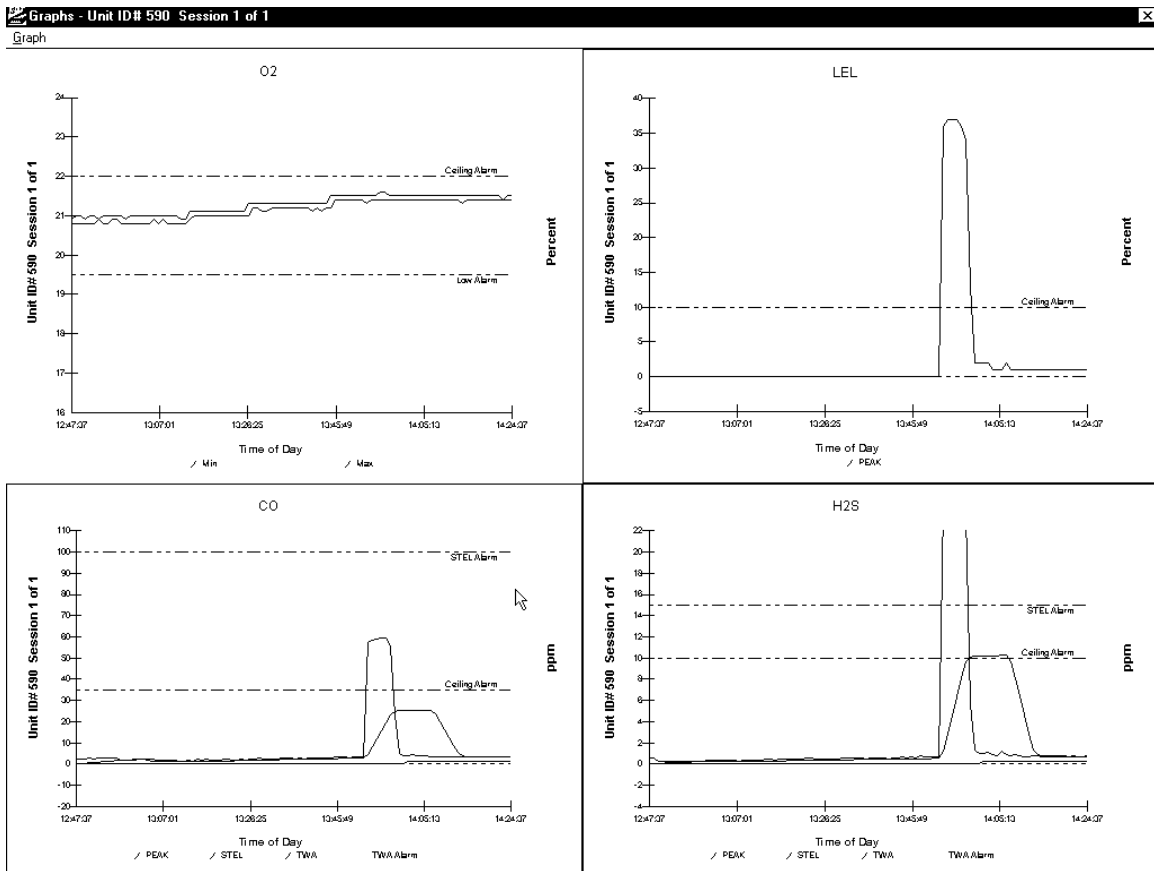


Figure 3.3 - Gas Level Readings in Graphical Format

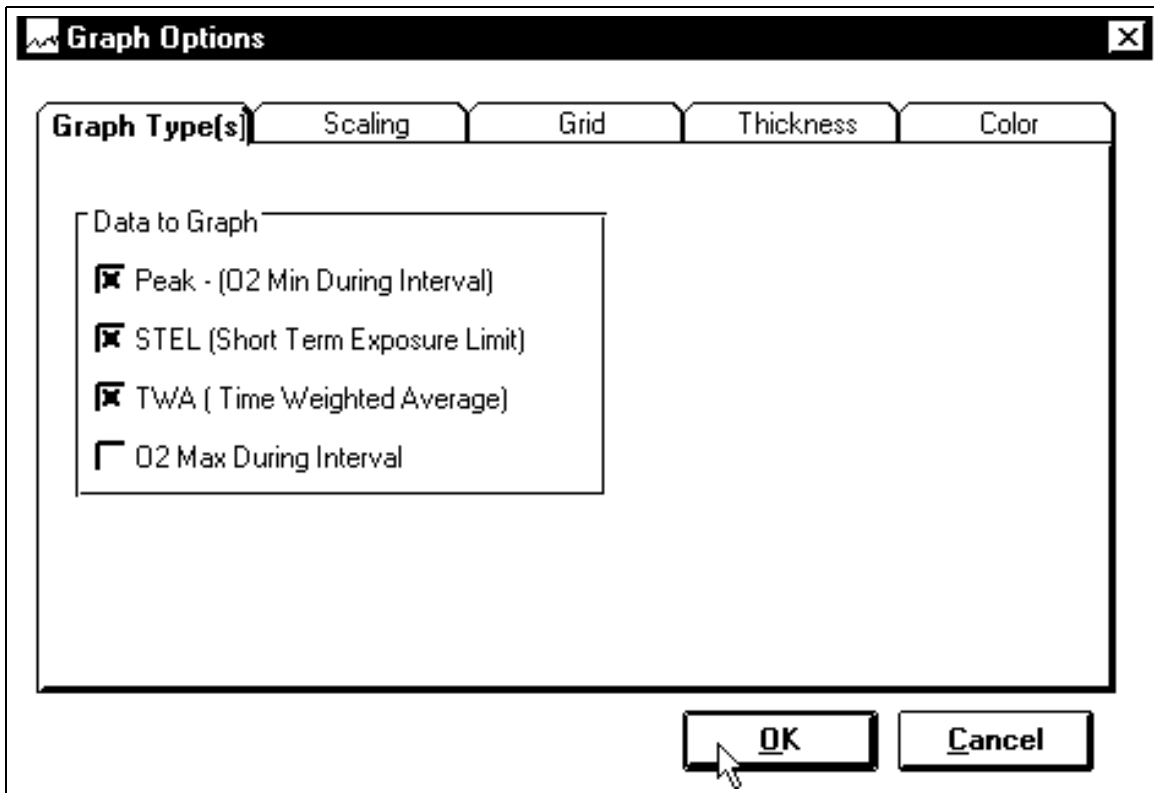


Figure 3.4 - Graph Options

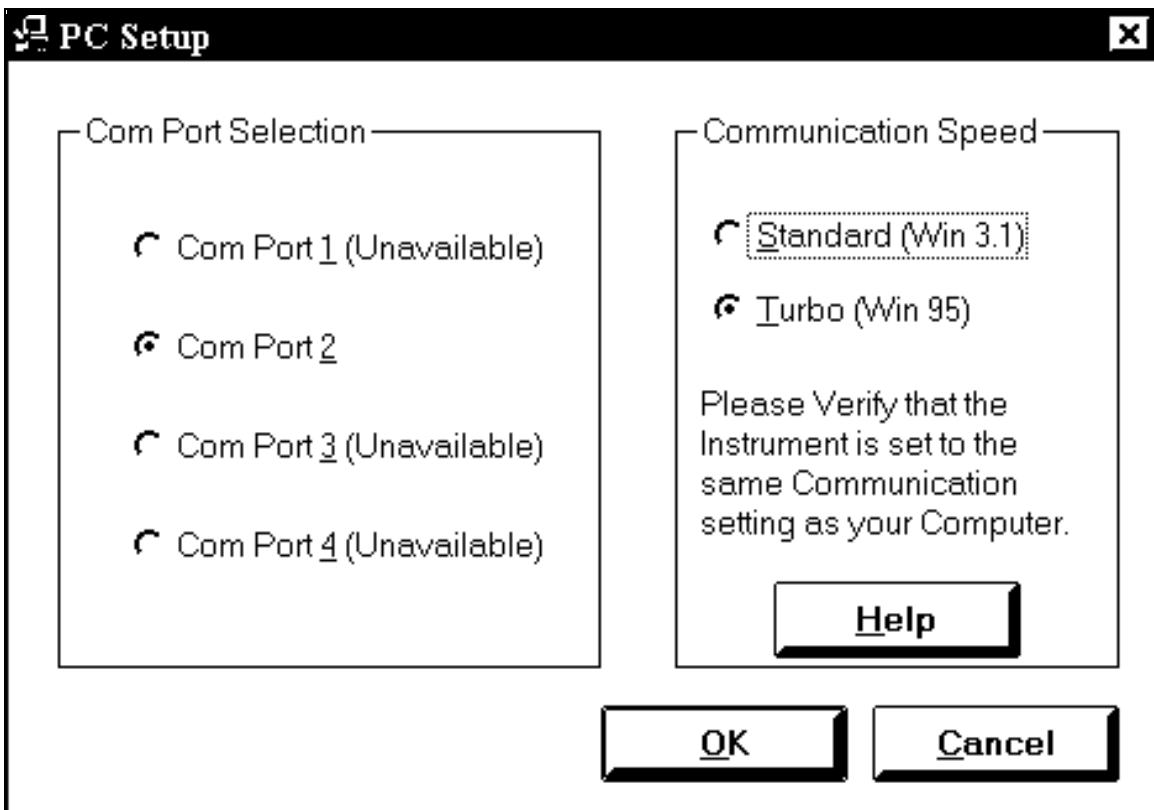


Figure 4.1 - Computer Communication Settings