LIGHTHOUSE
WORLDWIDE SOLUTIONS

LMS XChange

Operating Manual

Lighthouse Worldwide Solutions

LMS XChange

Operating Manual

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About This Manual

This manual describes the LMS XChange application, a program designed to download and analyze data from a Lighthouse SOLAIR or HANDHELD Particle Counter.

Audience

The *LMS XChange Manual* is written for the user who wants to view data from Lighthouse SOLAIR and/or HANDHELD particle counters.

If you need expanded monitoring capabilities, please contact your Lighthouse Worldwide Solutions Sales Representative for information on the advanced program, LMS Express or the full scale Lighthouse Monitoring System.

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Text Conventions

The following typefaces have the following meanings:

WARNING: ***A warning appears in a paragraph like this and warns that doing something incorrectly could result in personal injury, damage to the instrument or loss and/or improper storage of data.***

italics	Represents information not to be typed or interpreted literally. For example, *file* represents a file name. Manual titles are also displayed in italics.
boldface	Introduces or emphasizes a term.
bold italics	Indicates a setting in a window for which you must provide a value.

Note: *A note appears in the sidebar to give extra information regarding a feature or suggestion*

Additional Help

For more information about LMS XChange, contact Lighthouse Worldwide Solutions.

Lighthouse Worldwide Solutions

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techsupport@golighthouse.com
www.golighthouse.com

1 Overview

The LMS XChange program is designed to be used with Lighthouse's SOLAIR and HANDHELD Particle Counters. LMS XChange downloads the data collected on these instruments and displays the data in a table that the user can view and/or save to an Excel or HTML file.

LMS XChange has the following features:

- Easy installation
- Auto-detects Lighthouse particle counters on a COM port; no special port or driver configuration required
- Manual data download from Lighthouse particle counters
- Displays data in a table
- Allows the user to print the data table
- Allows the user to save the data to an Excel or HTML file
- Allows users to configure alphanumeric location names. Users can also upload these names to Lighthouse instruments that support alphanumeric location names.
- Uses Window's regional settings for displaying dates and decimal numbers

Note: *Time is always displayed in 24 hour time.*

Basic Concepts

Terms and concepts important to LMS XChange are explained below.

Downloaded Data The set of data downloaded from an instrument. Includes location and channel information.

Instrument A Lighthouse particle counter, either from the SOLAIR family of counters or the HANDHELD family of counters. The particle counter is identified by the model of the counter.

Location Alphanumeric names assigned by the instrument to represent different areas where samples were taken. In LMS XChange, alphanumeric location names can be downloaded from and uploaded to

an instrument that supports them. Instruments that do not support alphanumeric locations names will have default location names assigned to their locations following the format "LOCXXX" where XXX is the location number from the instrument. In all cases Locations can also be assigned a descriptive longer name in LMS XChange.

Data Type Describes the kind of data collected. For particle counters, this is the micron size of the particle; for environmental sensors, this is the kind of analog sensor (i.e. air velocity, temperature, etc.) used.

Features

Instrument Download

LMS XChange will auto-detect Lighthouse instruments via a COM port RS-232 connection.

When a download is complete, the serial number and model of the instrument, as well as the date the data was downloaded, the range of the data and whether the particle data is differential or cumulative will be displayed.

Data Table

Data is displayed in a table format. Summary statistics will be calculated per channel and displayed at the bottom of the table under the following headings: Standard Deviation, Average, Maximum data point and Minimum data point. The Data Table can be printed or exported to Microsoft Excel™ *.xls, Comma Separated Value (*.csv), or HTML (*.html, *.htm) files.

Location Setup

When the data is downloaded to LMS XChange, the location(s) associated with the data are recorded using an alphanumeric Location ID. By default, the "name" of the location is "LOCXXX" where "XXX" is its numeric ID. If alphanumeric location names are set up on the instrument, then the alphanumeric location names will be downloaded with the data. You can update or change the location name and a description for it. If the instrument supports alphanumeric location names, you can upload your changed location names to the instrument.

2 Getting Started

This chapter describes the LMS XChange environment including the toolbar and menu commands, explains how to use the mouse and details the operating system requirements necessary to run LMS XChange.

Installation

When installing LMS XChange, it is recommended to also install Adobe's free Acrobat Reader in order to be able to view this LMS XChange manual on-line. Acrobat Reader is provided on the same CD as LMS XChange.

Install LMS XChange by inserting the INSTALL CD into the CD drive. The installation program should start automatically. If it does not, run the setup.exe located in the LMS XChange CD's root directory.

Startup

Start LMS XChange by double clicking on the LMS XChange icon on your desktop:

Figure 2-1 LMS XChange Desktop Icon

Alternatively, LMS XChange can be launched by opening the Start Menu, Programs Menu and selecting LMS XChange.

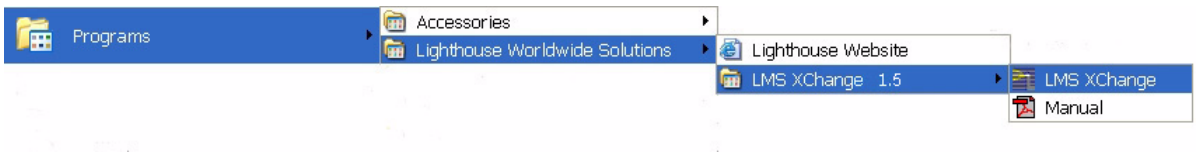


Figure 2-2 Start Menu access to LMS XChange

From the Start Menu, you can also go to the Lighthouse Worldwide Solutions website or open the Operating Manual.

Shutdown

To shut down LMS XChange, press **Alt+F4**, click on the "x" in the upper right corner or click on the system menu (the LMS XChange icon in upper left corner) and select “Close”.

The Main Window

The LMS XChange Main window is shown below. When LMS XChange is started, the application will be maximized on your screen.

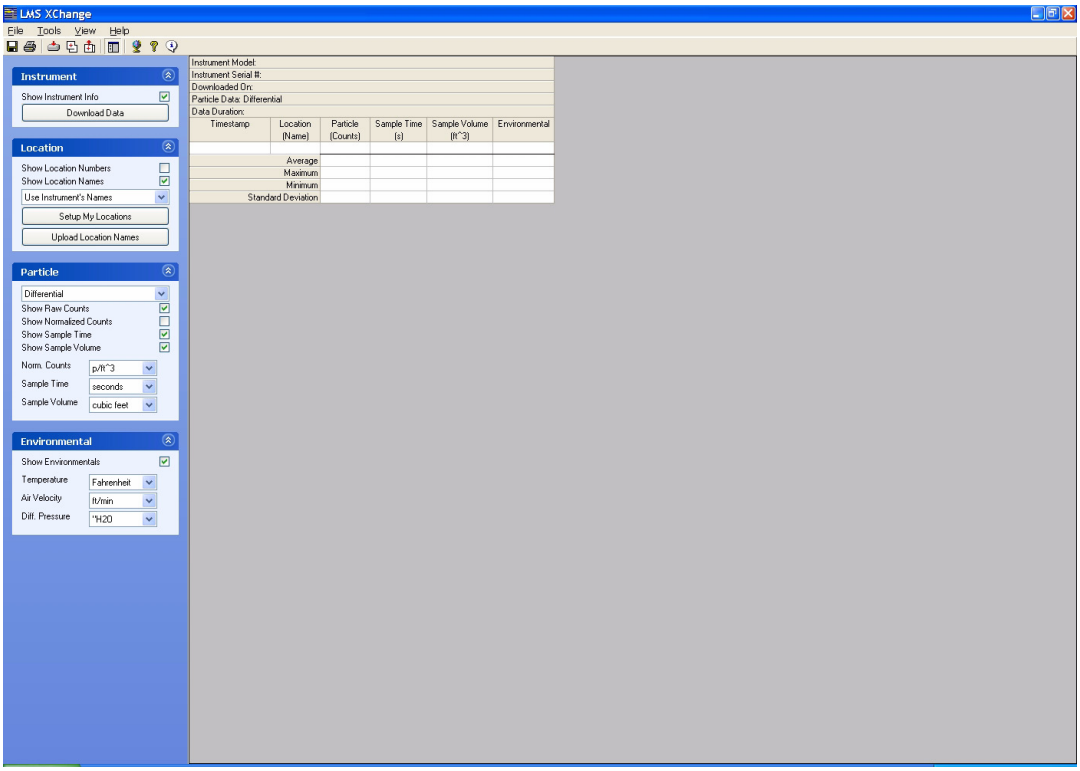


Figure 2-3 LMS XChange Main Window

Note: *Only one instance of LMS XChange can run at a time.*

Tasks are performed using the menu, configuration bar and the toolbar.

Basic User Interface

LMS XChange's user interface was designed with simplicity in mind. It is split into several basic parts: the menu, toolbar, configuration bar, and data table.

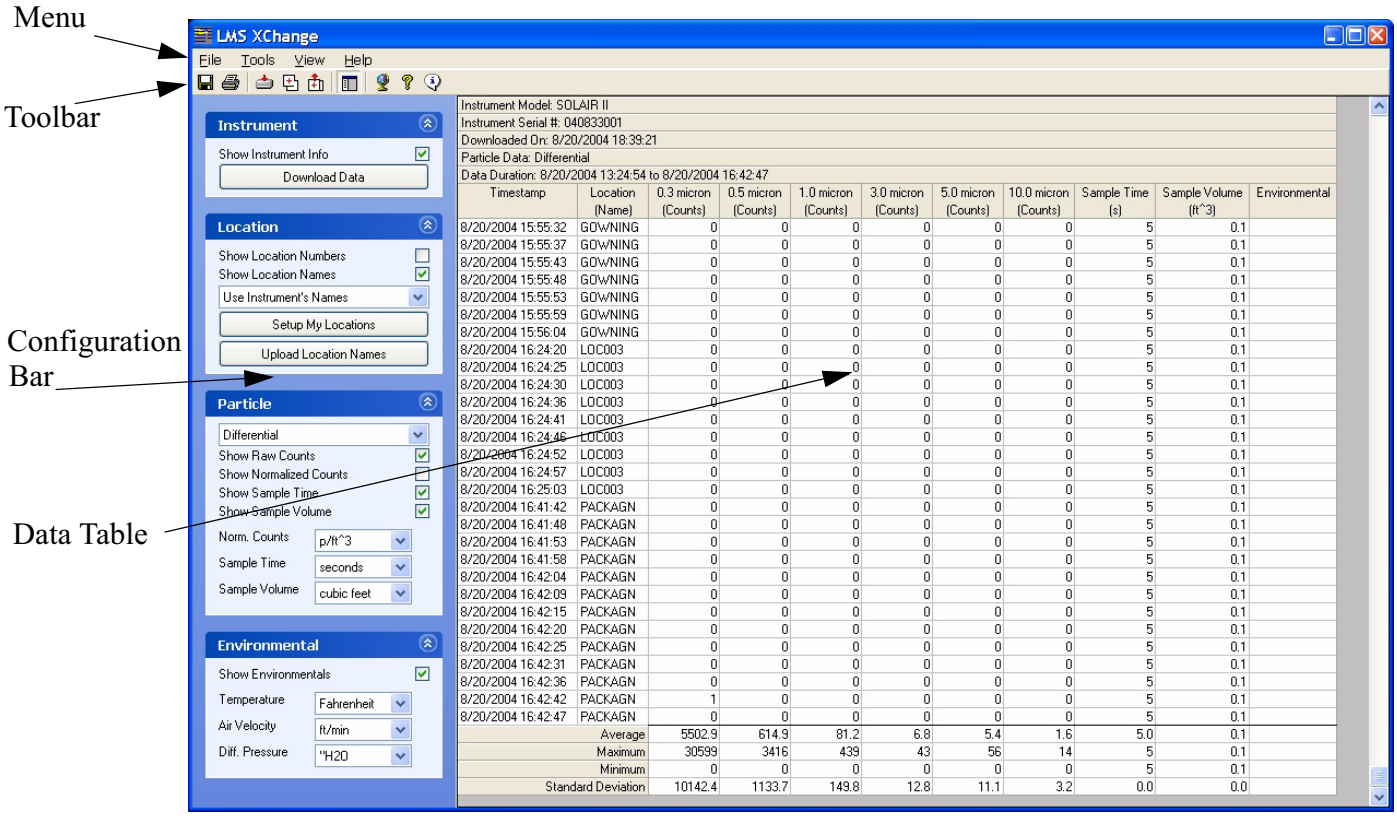


Figure 2-4 LMS XChange User Interface

Menu

The menu is used to select particular features or functions. The menu consists of four pulldown menus: File, Tools, View and Help.

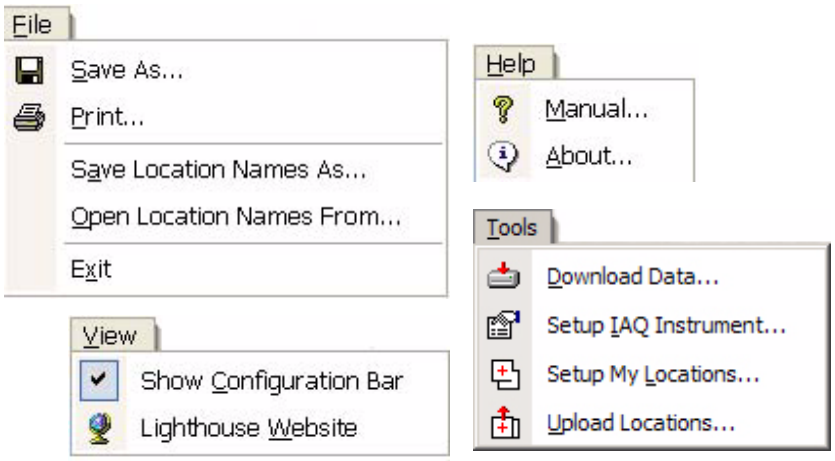


Figure 2-5 LMS XChange Pulldown Menus

Data Table

After data is downloaded, it will be displayed on the main window's Data Table.

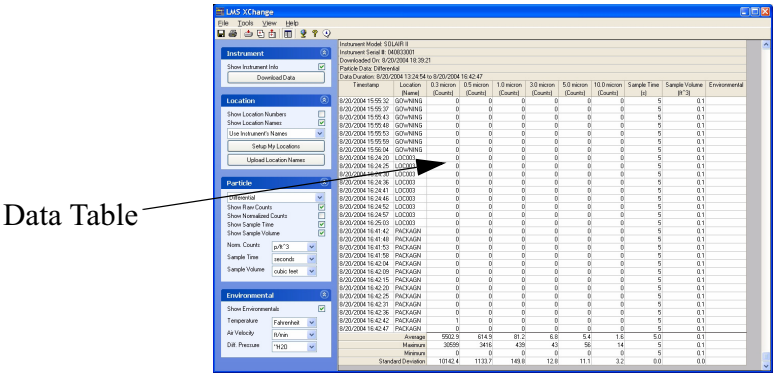


Figure 2-6 LMS XChange Data Table area

Configuration Bar

The configuration bar is used to setup the Data Table.

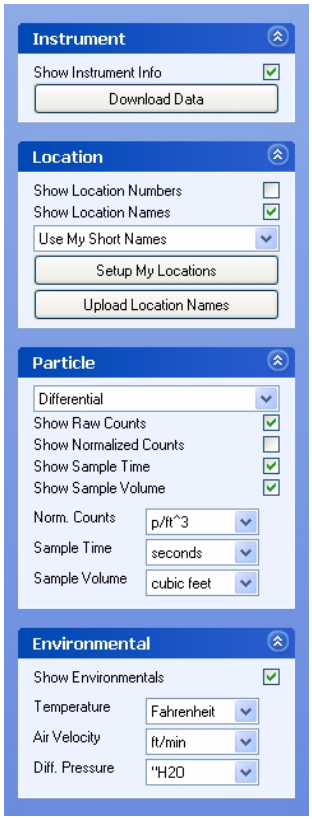


Figure 2-7 Configuration Bar

Check or uncheck items and/or select items from the pull down lists to update the displayed Data Table appropriately.

Toolbar

The Toolbar buttons allow the user to save or print the data table, change location names, download data and display information provided by Lighthouse.

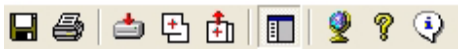


Figure 2-8 Toolbar

The following table describes the toolbar buttons and their functions.

Table 2-1 Toolbar Buttons and Commands

Button	Command	Description
	Save As	Opens a Save As dialog box and saves the current Data Table information to a file. Data Tables can be saved as *.xls, *.csv or *.html files.
	Print	Opens a Print Setup dialog box and prints the current view.
	Download Data	Opens the Data Download Wizard to walk the user through downloading data from an instrument.
	Setup Locations	Opens a list of all the possible locations numbers and their assigned location names. From this list the user can update location names.
	Upload Location Names	Upload locatiom names to instrument.
	Show/hide Config Bar	Toggles the configuration bar on/off. Default is on.
	Web Link	Opens a web browser and displays the Lighthouse Worldwide Solutions website, www.golighthouse.com.
	Help	Displays the LMS XChange manual (Acrobat Reader is needed to view this file).
	About	Opens LMS XChange's About Box. Displays the version number, copyright information and license agreement.

About window

Clicking the About toolbar button or selecting the About LMS

XChange option from the Help menu, displays the following About window.

Figure 2-9 About Box

Select the OK button or click on the “x” in the upper right corner to remove this window from the screen.

About the Mouse

A mouse is recommended to use LMS XChange.

You can perform all LMS XChange actions with the mouse. The exception is entering text information, which is done with the keyboard. Use the mouse to select commands, select views and select options in windows. Here is a list of mouse terms and their meanings:

Term	Meaning
Mouse Cursor	The small arrow or other symbol that moves when you slide the mouse across the pad.
Mouse Button	A button on the mouse that you press. A mouse usually has two or three buttons.
Click	Move the mouse cursor over the command or other object, then press and release the left mouse button.

Drag	Move the mouse cursor over the command or other object, then press and hold down the mouse button while moving the mouse.

About Microsoft Windows™

LMS XChange runs on Microsoft Windows 2000™, Windows XP™ and Windows Vista™. LMS XChange requires Internet Explorer 5.0 or greater.

Each Microsoft™ Windows window contains a title bar, scroll bars, outer border and other parts as shown in the following figure:

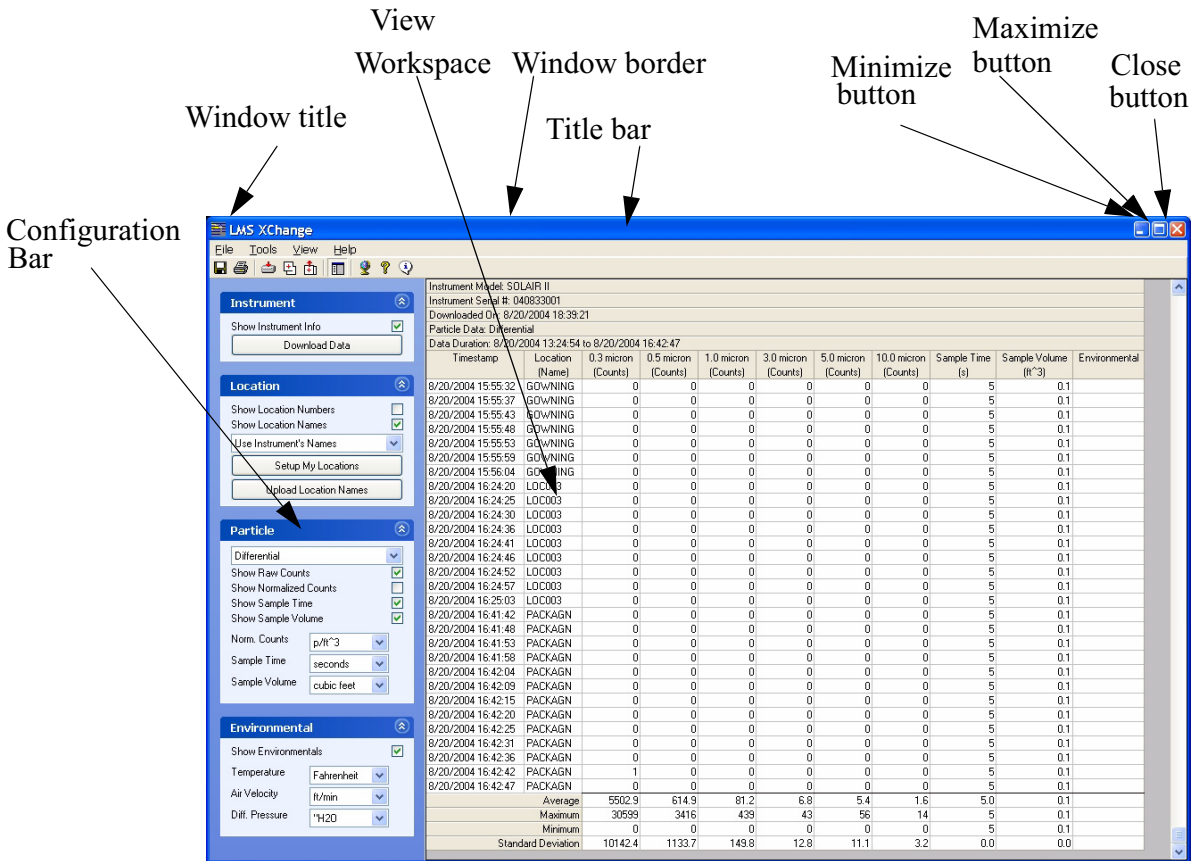


Figure 2-10 Microsoft Window Structure

For more information about Microsoft Windows, consult the Microsoft Windows documentation.

3 Downloading Data

This chapter describes how to download data from a Lighthouse Worldwide Solutions particle counter to LMS XChange.

Downloading Data

Using the connector and cable provided with the software program, connect the instrument to an unused COM port on your computer.

Launch LMS XChange.

Click the **Download Data** button on the Configuration Bar.

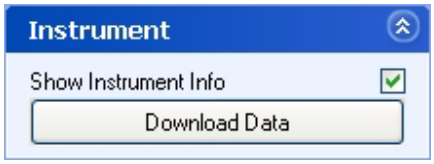


Figure 3-1 Instrument, Download Data button

Note: *Please make sure to stop all actions on the instrument before beginning the download process.*

The Data Download Wizard window will appear:

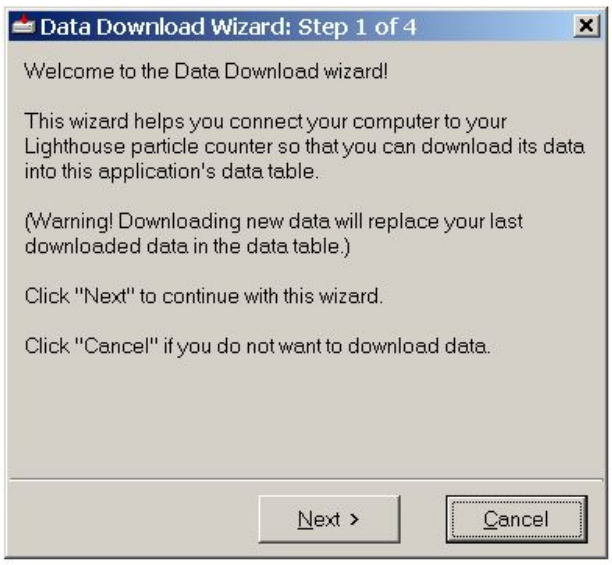


Figure 3-2 Download Data Wizard, Step 1

Click **Next >**.

The next step will appear:

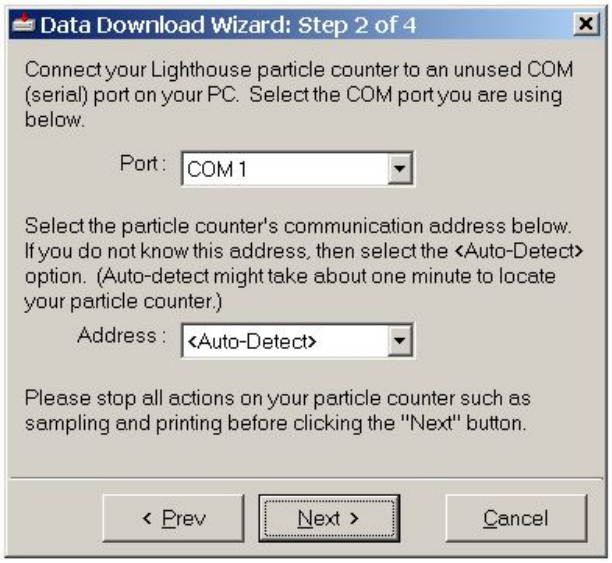


Figure 3-3 Data Download Wizard Step 2

Note: *LMS XChange has an auto-detect feature that will find a Lighthouse HANDHELD or SOLAIR instrument when it is connected to the specified COM port via an RS-232 cable.*

Use the pulldown list of Ports to select the COM port to which you have connected the Lighthouse instrument.

Pick a specific communication address from the list of Addresses or select **<Auto-Detect>**.

Click the **Next >** button to continue to the next page of the Wizard.

To begin the download, click the **Next >** button.

The data download will start. While in progress, the data download will show the following progress bar. On the right side of the progress bar, the percentage of the records already downloaded will be displayed.

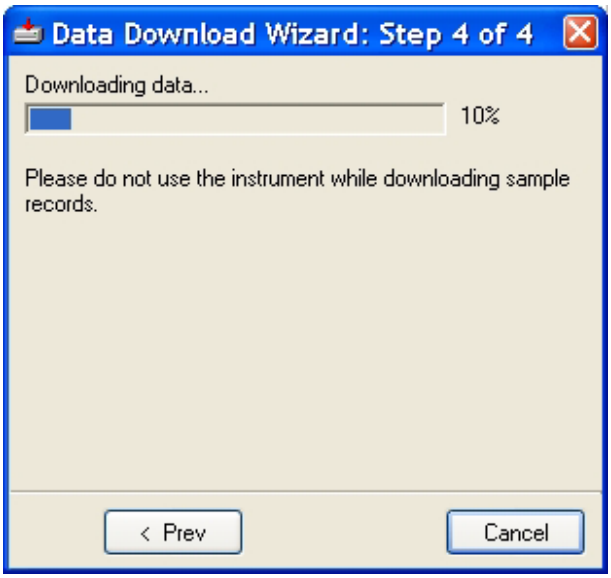


Figure 3-4 Data download in progress

When LMS XChange has finished downloading the data, the progress window will show **Done**.

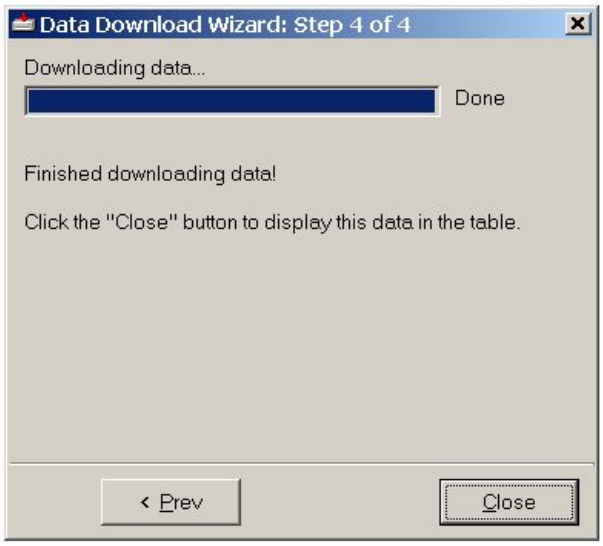


Figure 3-5 Data Download complete

Click the **Close** button to automatically display the data in the Data Table.

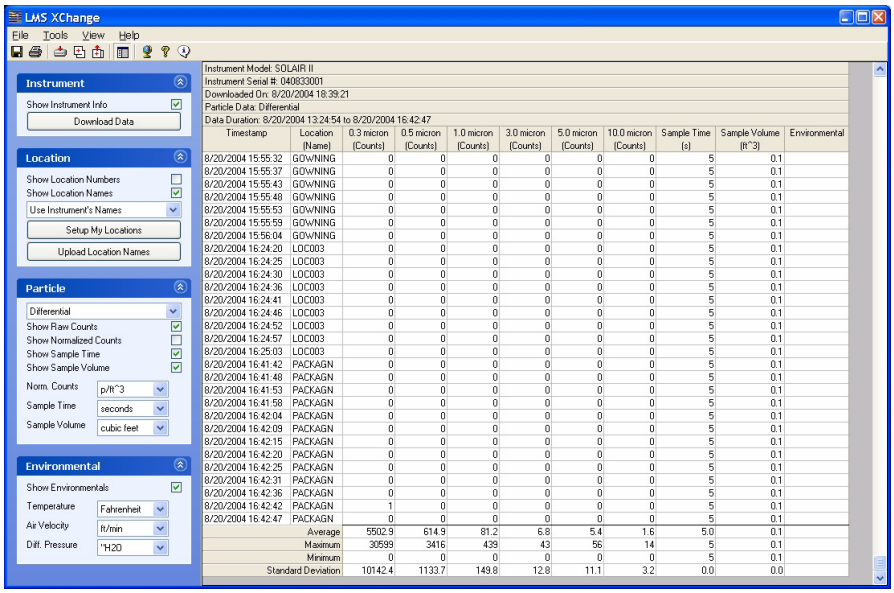


Figure 3-6 Downloaded data displayed on Data Table

Trouble shooting

If the download is not successful or if the connection between the instrument and the computer was interrupted during the download, LMS XChange may display one of the following windows.

Instrument Not Found

If LMS XChange could not locate the instrument, the Data Download Wizard will display the following information.

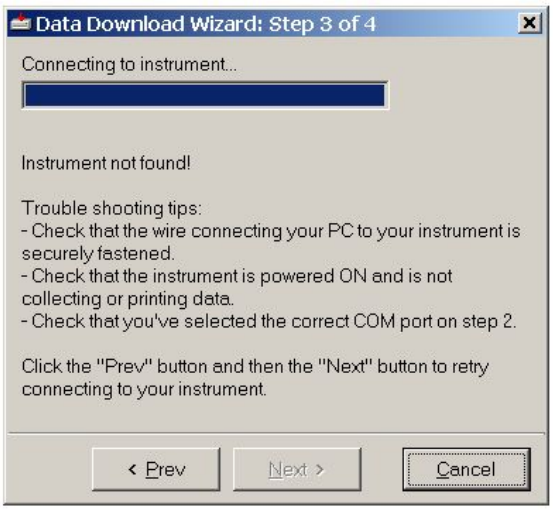


Figure 3-7 Instrument Not found

Follow the troubleshooting tips listed on the window.

Click the **< Prev** button and then the **Next >** button to retry connecting to your instrument.

No Data to Download

If the instrument does not contain any data, the following window will appear when LMS XChange attempts to download data from the instrument.

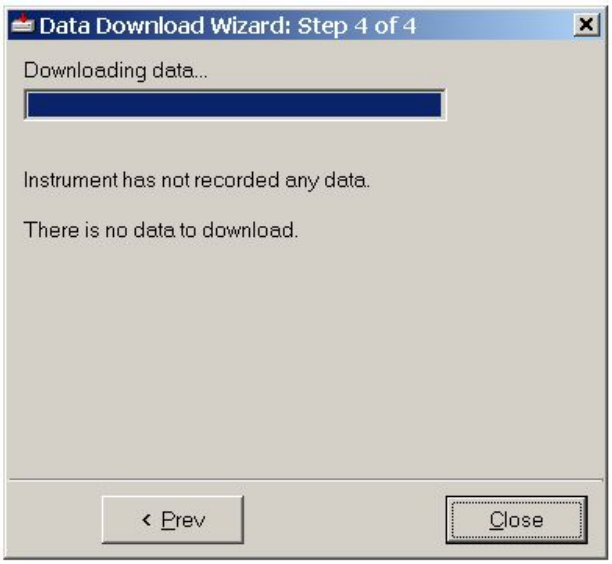


Figure 3-8 No data found

Click **Close** to close the Data Download Wizard. Collect data with the instrument before attempting to download data from it again.

Connection Lost

If the connection to the instrument is lost while the download is in progress, LMS XChange will display the following window,

Figure 3-9 Connection Lost

Click OK to acknowledge the message.

LMS XChange will return to the second step in the Data Download Wizard. Reconnect the instrument to the computer and try downloading data again by clicking the **Next >** button.

4 Data Display

This chapter describes displaying data in the Data Table.

Data Table

After a data download has finished, the Data Table updates and displays the downloaded data.

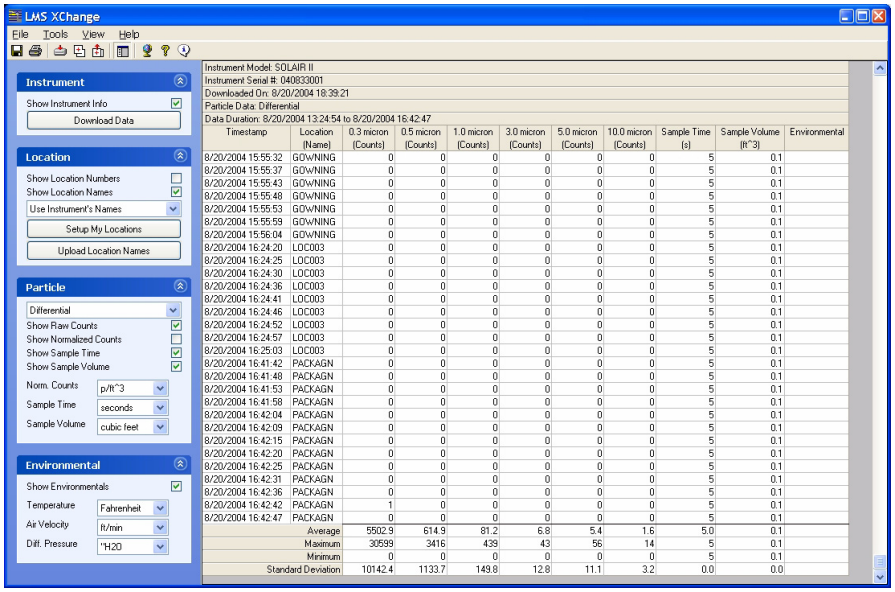


Figure 4-1 Data Table, displaying data

Note: *Data previously displayed is discarded after the next data download is successful.*

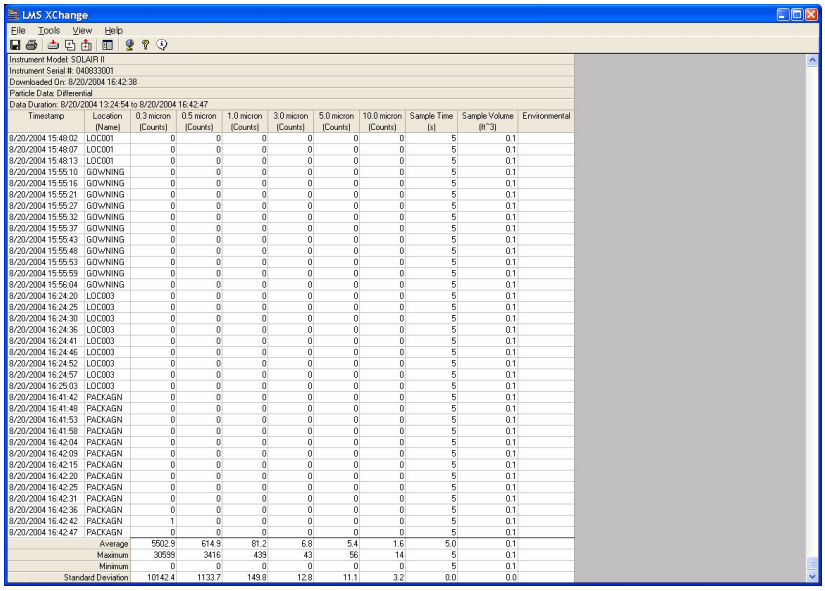
A Data Table displays as many records as are downloaded from a Lighthouse SOLAIR or HANDHELD.

By default LMS XChange displays information about the instrument and the date and time, channel sizes, etc. of the data that was downloaded.

To display more information on the window, hide the Configuration Bar by clicking on the **Show/Hide Configuration** toolbar button:

Figure 4-2 Show/hide Configuration Bar toolbar button

By default the Configuration Bar is displayed. When the Configuration Bar is hidden, the LMS XChange window appears as follows:



Timestamp	Location (Name)	0.3 micron (Counts)	0.5 micron (Counts)	1.0 micron (Counts)	3.0 micron (Counts)	5.0 micron (Counts)	10.0 micron (Counts)	Sample Time (s)	Sample Volume (ft^3)	Environmental
8/20/2004 15:48:02	LOC001	0	0	0	0	0	0	5	0.1	
8/20/2004 15:48:07	LOC001	0	0	0	0	0	0	5	0.1	
8/20/2004 15:48:13	LOC001	0	0	0	0	0	0	5	0.1	
8/20/2004 15:55:10	GOWNING	0	0	0	0	0	0	5	0.1	
8/20/2004 15:55:16	GOWNING	0	0	0	0	0	0	5	0.1	
8/20/2004 15:55:21	GOWNING	0	0	0	0	0	0	5	0.1	
8/20/2004 15:55:27	GOWNING	0	0	0	0	0	0	5	0.1	
8/20/2004 15:55:32	GOWNING	0	0	0	0	0	0	5	0.1	
8/20/2004 15:55:37	GOWNING	0	0	0	0	0	0	5	0.1	
8/20/2004 15:55:43	GOWNING	0	0	0	0	0	0	5	0.1	
8/20/2004 15:55:48	GOWNING	0	0	0	0	0	0	5	0.1	
8/20/2004 15:55:53	GOWNING	0	0	0	0	0	0	5	0.1	
8/20/2004 15:55:59	GOWNING	0	0	0	0	0	0	5	0.1	
8/20/2004 15:56:04	GOWNING	0	0	0	0	0	0	5	0.1	
8/20/2004 16:24:20	LOC003	0	0	0	0	0	0	5	0.1	
8/20/2004 16:24:25	LOC003	0	0	0	0	0	0	5	0.1	
8/20/2004 16:24:30	LOC003	0	0	0	0	0	0	5	0.1	
8/20/2004 16:24:36	LOC003	0	0	0	0	0	0	5	0.1	
8/20/2004 16:24:41	LOC003	0	0	0	0	0	0	5	0.1	
8/20/2004 16:24:46	LOC003	0	0	0	0	0	0	5	0.1	
8/20/2004 16:24:52	LOC003	0	0	0	0	0	0	5	0.1	
8/20/2004 16:24:57	LOC003	0	0	0	0	0	0	5	0.1	
8/20/2004 16:25:03	LOC003	0	0	0	0	0	0	5	0.1	
8/20/2004 16:41:42	PACKAGN	0	0	0	0	0	0	5	0.1	
8/20/2004 16:41:48	PACKAGN	0	0	0	0	0	0	5	0.1	
8/20/2004 16:41:53	PACKAGN	0	0	0	0	0	0	5	0.1	
8/20/2004 16:41:58	PACKAGN	0	0	0	0	0	0	5	0.1	
8/20/2004 16:42:04	PACKAGN	0	0	0	0	0	0	5	0.1	
8/20/2004 16:42:09	PACKAGN	0	0	0	0	0	0	5	0.1	
8/20/2004 16:42:15	PACKAGN	0	0	0	0	0	0	5	0.1	
8/20/2004 16:42:20	PACKAGN	0	0	0	0	0	0	5	0.1	
8/20/2004 16:42:25	PACKAGN	0	0	0	0	0	0	5	0.1	
8/20/2004 16:42:31	PACKAGN	0	0	0	0	0	0	5	0.1	
8/20/2004 16:42:36	PACKAGN	0	0	0	0	0	0	5	0.1	
8/20/2004 16:42:42	PACKAGN	1	0	0	0	0	0	5	0.1	
8/20/2004 16:42:47	PACKAGN	0	0	0	0	0	0	5	0.1	
	Average	5502.9	614.9	81.2	6.8	5.4	1.6	5.0	0.1	
	Maximum	30599	3416	439	43	56	14	5	0.1	
	Minimum	0	0	0	0	0	0	5	0.1	
	Standard Deviation	10142.4	1133.7	149.8	12.8	11.1	3.2	0.0	0.0	

Figure 4-3 Configuration Bar hidden

Click the **Show/Hide Configuration Bar** toolbar button to redisplay the Configuration Bar.

Scrolling

Use the scroll bars to scroll through the data when there is more data in the view than the Data Table can display at one time.

When you scroll down or up through the data, the Data Table's header remains fixed. Only the data records scroll.

Statistics

The bottom of the Data Table contains a section of summary statistics. Summary statistics include the Average, Maximum, Minimum, and

Standard Deviation values for each channel or environmental sensor.

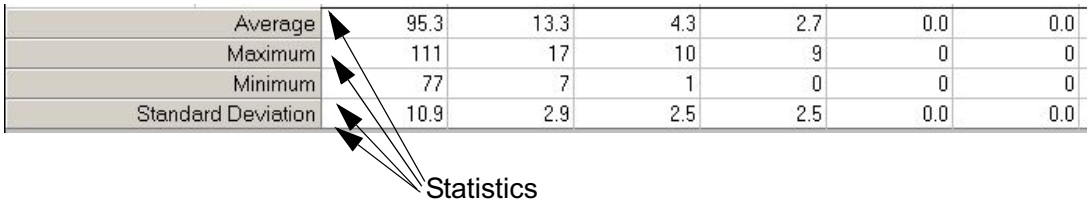


Figure 4-4 Data Table Summary Statistics

Configuration Bar

Use the Configuration bar on the left side of the LMS XChange window to change how data is displayed. The following sections describe the different formats and units the Data Table uses to display data.

Instrument

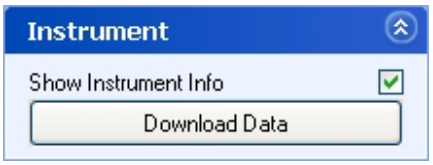


Figure 4-5 Instrument information

Options in the instrument section of the Configuration Bar allow you to show or hide instrument information and start downloading data.

Show Instrument Info

After data is downloaded, when "Show Instrument Info" is checked, the Data Table header displays the instrument's model number, serial number, and the date and time data was downloaded as well as the type of particle data displayed (Differential or Cumulative) and the duration of the downloaded data.

Figure 4-6 Show Instrument Info, checked

When not checked, the Data Table header displays only the type of

particle data displayed (Differential or Cumulative) and the duration of the downloaded data.

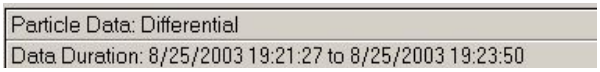


Figure 4-7 Show Instrument Info, not checked

Download Data

Click the Download Data button in the Instrument section of the Configuration Bar to start the Data Download Wizard. For details on downloading data, see the chapter on Downloading Data.

Location

The location section of the Configuration Bar allows you to show or hide location names and numbers, display the instrument's name, your short name or longer description, and set and/or upload location names.

Figure 4-8 Location information

Show Location Numbers

When "Show Location Numbers" is checked, the Data Table displays a Location Numbers column and the location numbers for each data record. When not checked, the Location Numbers column is not displayed.

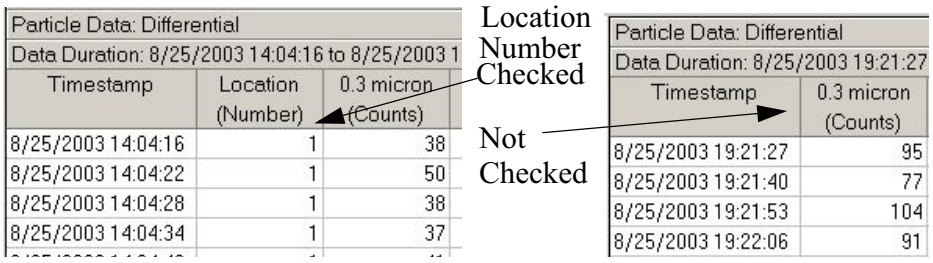


Figure 4-9 Show Location Numbers, checked and not checked

Show Location Names

Note: *When both "Show Location Numbers" and "Show Location Names" are checked, the Data Table displays both columns.*

When "Show Location Names" is checked, the Data Table displays a Location Name column and the location name assigned to the location number for each data record. When not checked, the Location Names column is not displayed.

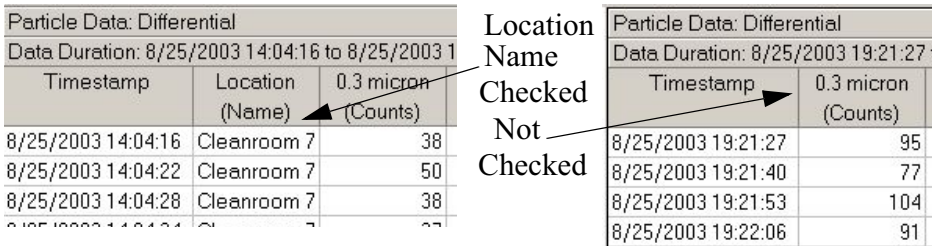


Figure 4-10 Show Location Names, checked and not checked

Location Names can be displayed in three forms - Instrument Names, Long Names, or Short Names. The user can select which way they want to display the Location Names using the list below the Show Location Names check box. This list is shown in the figure below.

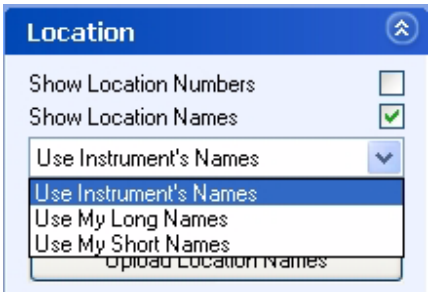


Figure 4-11 Location Names Display

Setup My Locations

When initially installed, LMS XChange assigns each location a default location name like "LOCXXX" where "XXX" is the location's number. Up to 200 location names can be maintained and downloaded from instruments.

To change a location name, click the "Setup My Locations" button. The following Setup My Locations window appears, displaying a list of all

location numbers and names.

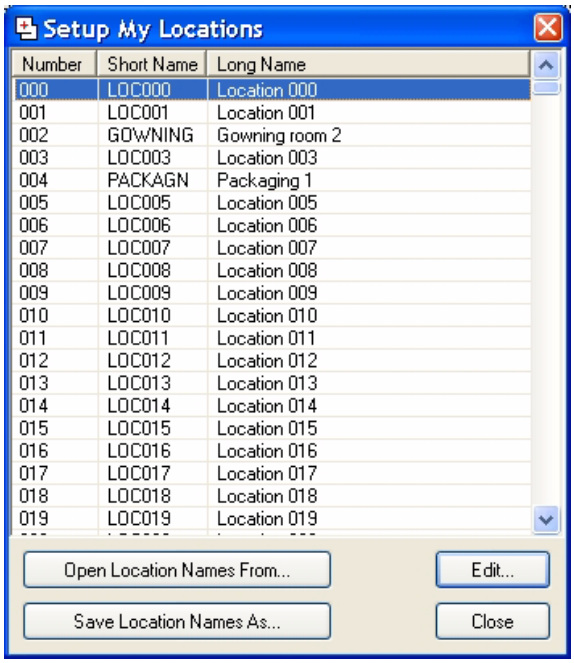


Figure 4-12 Locations window

To update a location name, select the Location Number row and double click on it, hit the Enter key, or click the "Edit" button. The following "Location Name" window appears, displaying the location's current long and short names.

Note: *Short Location Names can only contain capital letters (A-Z), integers (0-9) and underscores.*

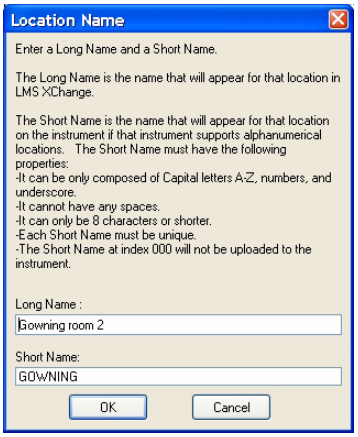


Figure 4-13 Setup Location window

To change the long or short Location Name, edit it and then click OK. To close the Setup My Location window without changing the current

location name, click the Cancel button.

Import Location Names

You can import Location Names by clicking the **Open Location Names From...** button on the **Setup My Locations** window.

Locations Names are stored in a file with the extension .loc. Browse and select the desired Location Name file and click Open. The list of Location Names will be imported, overwriting any previously loaded Location Names. For example, you can select the ***DefaultLocations.loc*** file installed in the **My Documents\LMS XChange\Locations** folder to restore all locations back to their initial names.

Save Location Names

You can save your list of Location Names by clicking the **Save Location Names As...** button on the Setup My Locations window.

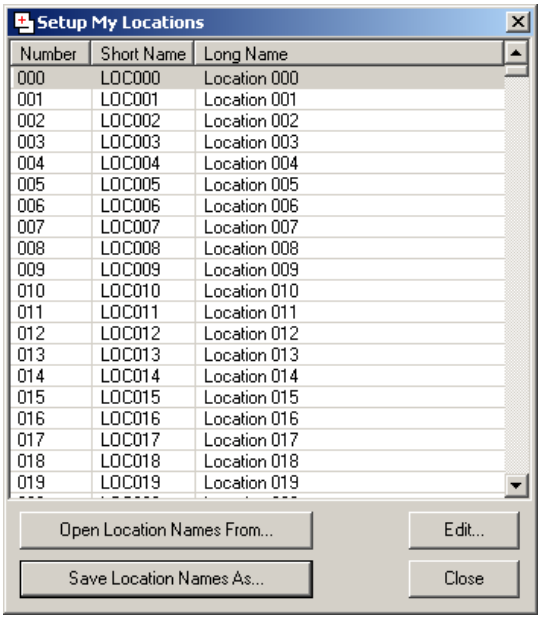


Figure 4-14 Setup My Locations Window

The following window displays:

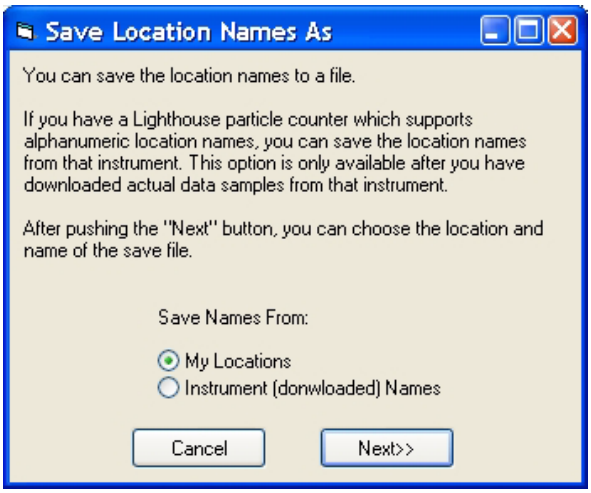


Figure 4-15 Save Location Names window

When the **Save Location Names As** window appears, you can choose to either save the instrument's location names or the ones you have created in LMS XChange.

If you have a Lighthouse instrument that supports alphanumeric location names and you have already downloaded data from the instrument to LMS XChange, you can save the instrument's Location Names to a file by selecting **Instrument (Downloaded) Names**.

As an alternative, select **My Locations** to save the location names you have created or edited in LMS XChange to a file.

Note: *If the instrument has empty location names, they are substituted with pre-generated names following the format, "LOC###". "###" is the index number for that location name.*

Click **Cancel** to abort saving Location Names, or click the **Next** button to continue.

If you clicked **Next**, browse and select the directory to save the file to, enter your desired file name (extension .loc), and click OK. Click **Cancel** to exit this window without saving Location Names.

Upload Location Names

Figure 4-16 Location, Configuration Bar

If your instrument is from Ligthhouse Worldwide Solutions and it supports alphanumeric location names, you can upload location names from LMS XChange to your instrument.

To do this, click **Upload Location Names** on the **Location** section of the Configuration Bar, click **Upload Location Names** tool bar button, or select **Upload Location Names** from the Tools Menu.

The Upload Location Name Wizard appears:

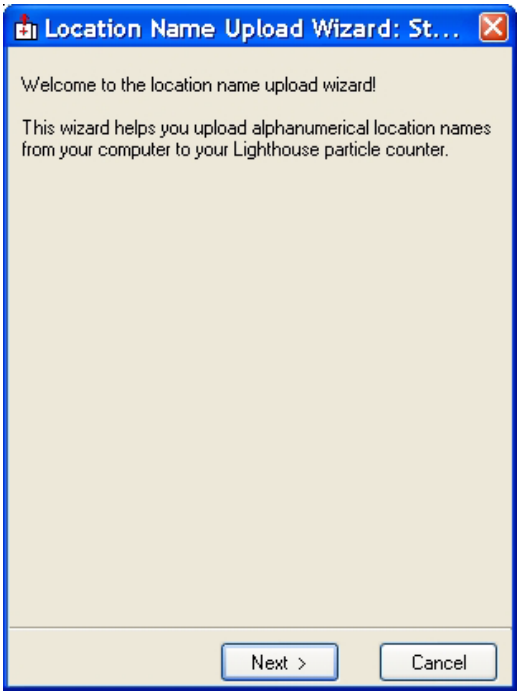


Figure 4-17 Location Name Upload Wizard

Click **Next >** to continue or **Cancel** to cancel the operation.

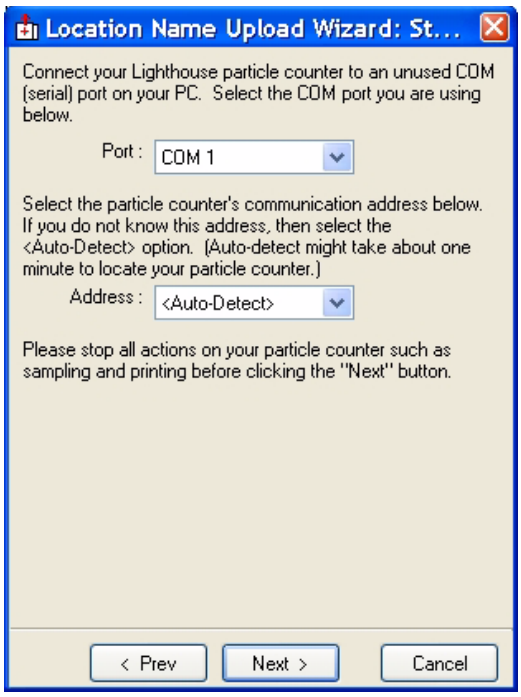


Figure 4-18 UpLoad Location Name Wizard, continued

Select the COM Port and Address to search for the instrument. Just like when downloading data from an instrument, you can chose "Auto-Detect" as the address and LMS XChange will search for the instrument’s address.

Click **Next >** to continue, or **< Prev** to return to the previous step.

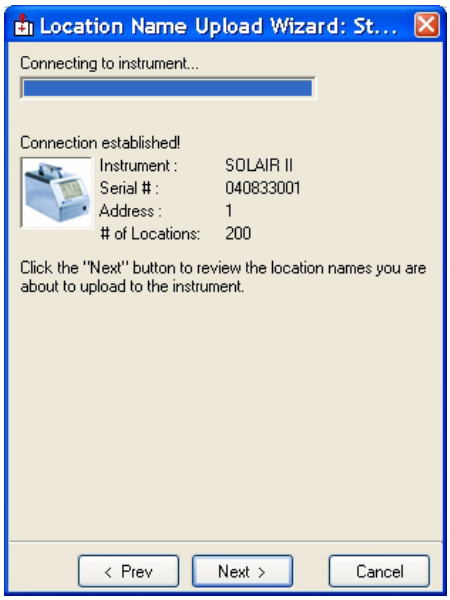


Figure 4-19 Upload Location Names Wizard, continued

If LMS XChange finds the instrument, the Wizard will display information about the instrument, its model, serial number, address and how many locations it currently has.

Click **Next >** to continue, or **< Prev** to return to the previous step.

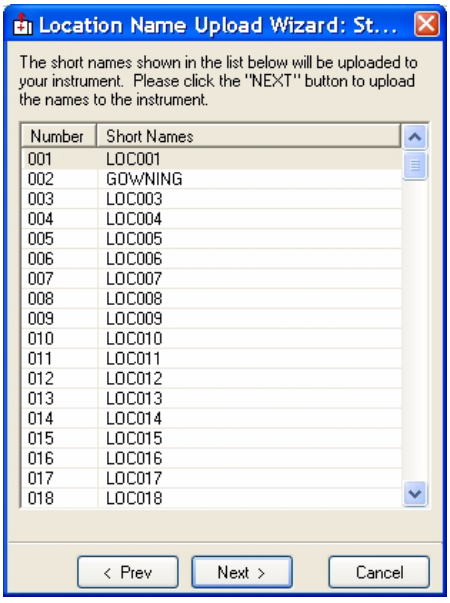


Figure 4-20 Upload Location Names Wizard, continued

The next Wizard step shows you a list of LMS XChange's location

names for your review. They will be uploaded to the instrument if you chose to continue.

WARNING: ***Uploaded Location Names will over write any Location Names that currently exist on the instrument.***

Click **Next >** to continue, or **< Prev** to return to the previous step.

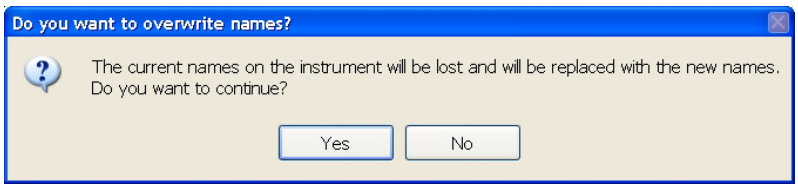


Figure 4-21 Upload Location Names, warning

Uploading location names overwrites any existing location names on the instrument.

Acknowledge the above warning by clicking **Yes** to continue or **No** to abort the Location Name Upload Wizard. If you click **Yes**, LMS XChange will start uploading location names.

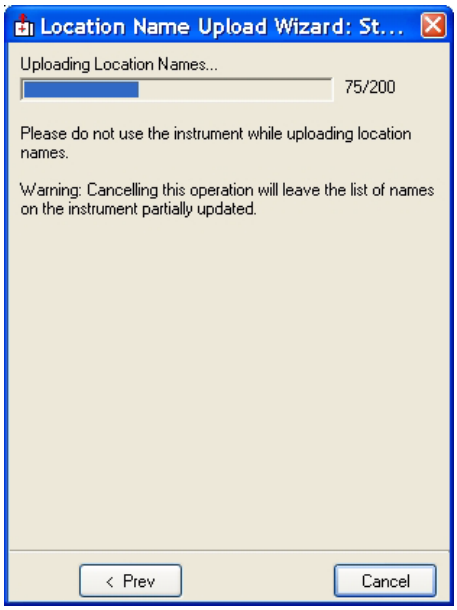


Figure 4-22 Location Name Upload, in progress

LMS XChange displays the progress of the location name upload on the above window. When the upload is complete, the window will change to say that it has finished the upload. Click "Close" to exit the Wizard.

Note: *If the instrument is disconnected while location names are being uploaded, a warning message will display.*

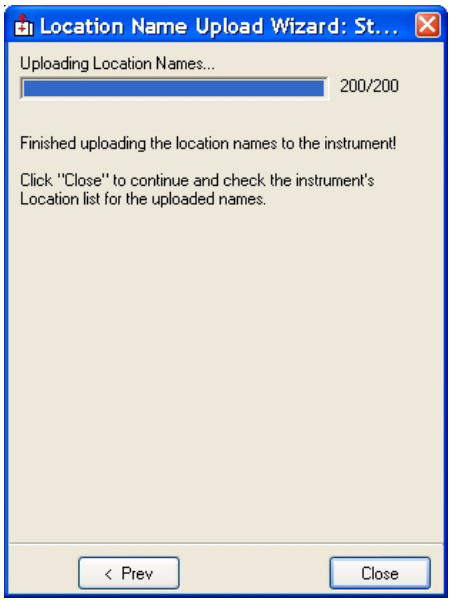


Figure 4-23 Upload Location Names Completed

Particle

The Particle section of the Configuration Bar allows you to display additional data in the Data Table and/or change the units the data is displayed in.

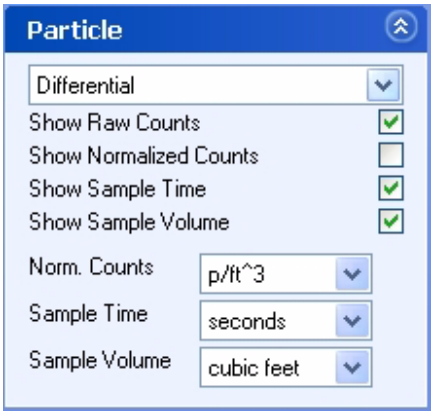
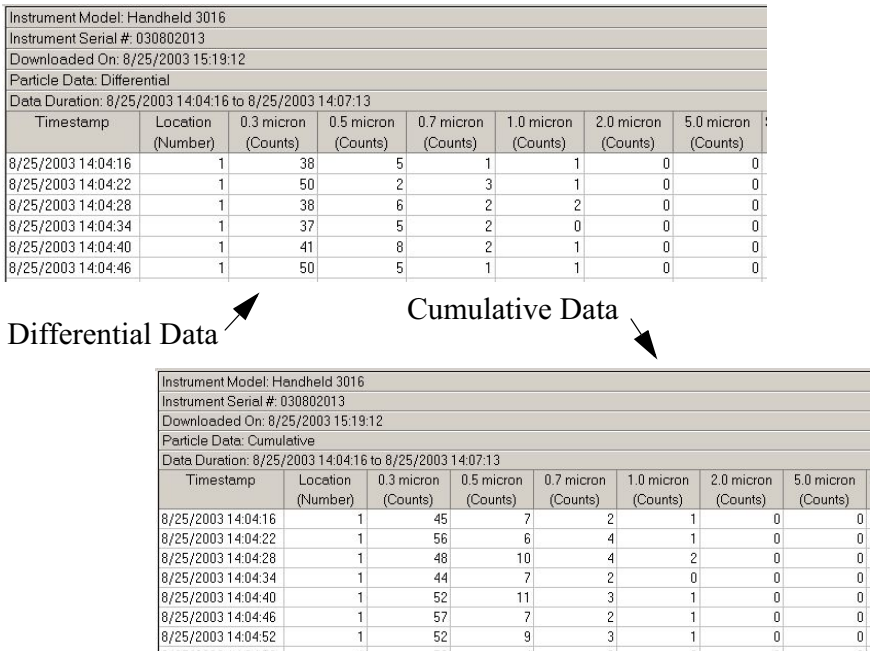


Figure 4-24 Particle section, Configuration Bar

Differential/Cumulative

The Differential/Cumulative pulldown list allows you to display the data in the Data Table as either Differential (default) or Cumulative data. To change from Differential to Cumulative, or visa versa, select

Differential or Cumulative from the list. The Data Table and its header update appropriately if particle data is displayed.



Instrument Model: Handheld 3016
Instrument Serial #: 030802013
Downloaded On: 8/25/2003 15:19:12
Particle Data: Differential
Data Duration: 8/25/2003 14:04:16 to 8/25/2003 14:07:13

Timestamp	Location (Number)	0.3 micron (Counts)	0.5 micron (Counts)	0.7 micron (Counts)	1.0 micron (Counts)	2.0 micron (Counts)	5.0 micron (Counts)
8/25/2003 14:04:16	1	38	5	1	1	0	0
8/25/2003 14:04:22	1	50	2	3	1	0	0
8/25/2003 14:04:28	1	38	6	2	2	0	0
8/25/2003 14:04:34	1	37	5	2	0	0	0
8/25/2003 14:04:40	1	41	8	2	1	0	0
8/25/2003 14:04:46	1	50	5	1	1	0	0

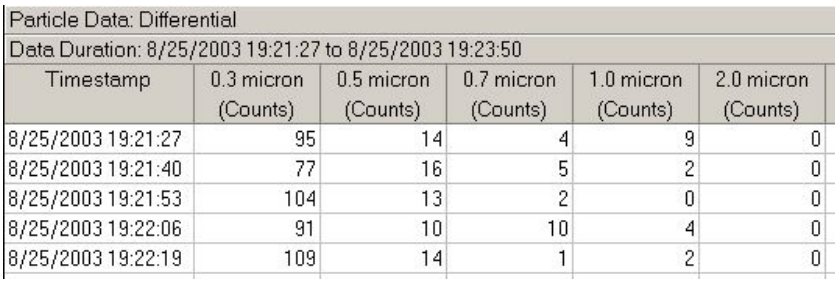
Instrument Model: Handheld 3016
Instrument Serial #: 030802013
Downloaded On: 8/25/2003 15:19:12
Particle Data: Cumulative
Data Duration: 8/25/2003 14:04:16 to 8/25/2003 14:07:13

Timestamp	Location (Number)	0.3 micron (Counts)	0.5 micron (Counts)	0.7 micron (Counts)	1.0 micron (Counts)	2.0 micron (Counts)	5.0 micron (Counts)
8/25/2003 14:04:16	1	45	7	2	1	0	0
8/25/2003 14:04:22	1	56	6	4	1	0	0
8/25/2003 14:04:28	1	48	10	4	2	0	0
8/25/2003 14:04:34	1	44	7	2	0	0	0
8/25/2003 14:04:40	1	52	11	3	1	0	0
8/25/2003 14:04:46	1	57	7	2	1	0	0
8/25/2003 14:04:52	1	52	9	3	1	0	0

Figure 4-25 Data Table display, Differential or Cumulative

Show Raw Counts

To display data as raw counts, check the **Show Raw Counts** check box. The Data Table updates and displays a column containing the raw count data for each particle channel size.



Particle Data: Differential
Data Duration: 8/25/2003 19:21:27 to 8/25/2003 19:23:50

Timestamp	0.3 micron (Counts)	0.5 micron (Counts)	0.7 micron (Counts)	1.0 micron (Counts)	2.0 micron (Counts)
8/25/2003 19:21:27	95	14	4	9	0
8/25/2003 19:21:40	77	16	5	2	0
8/25/2003 19:21:53	104	13	2	0	0
8/25/2003 19:22:06	91	10	10	4	0
8/25/2003 19:22:19	109	14	1	2	0

Figure 4-26 Show Raw Counts

Show Normalized Counts

Note: *When both Raw Counts and Normalized Counts are checked, the Data Table displays (from left to right) first raw count columns for each particle channel size and then normalized data columns.*

To display normalized data, check the **Show Normalized Counts** check box. The Data Table updates and displays a column containing the normalized data for each particle channels size.

Particle Data: Differential					
Data Duration: 8/25/2003 19:21:27 to 8/25/2003 19:23:50					
Timestamp	0.3 micron (p/m^3)	0.5 micron (p/m^3)	0.7 micron (p/m^3)	1.0 micron (p/m^3)	2.0 micron (p/m^3)
8/25/2003 19:21:27	167744.7	24720.3	7062.9	15891.6	0.0
8/25/2003 19:21:40	135961.5	28251.7	8828.7	3531.5	0.0
8/25/2003 19:21:53	183636.3	22954.5	3531.5	0.0	0.0
8/25/2003 19:22:06	160681.7	17657.3	17657.3	7062.9	0.0
8/25/2003 19:22:19	192464.9	24720.3	1765.7	3531.5	0.0

Figure 4-27 Show Normalized Counts

Show Sample Time

To show each data record's Sample Time, check **Show Sample Time**. The Data Table updates and displays a Sample Time column.

Sample Time (s)
5
5
5
5
5

Figure 4-28 Show Sample Time

Show Sample Volume

To show Sample Volume data for each data record, check **Show Sample Volume**. The Data Table updates and displays a Sample Volume column.

Sample Volume (L)
0.2
0.2
0.2
0.2
0.2

Figure 4-29 Show Sample Volume

Norm. Counts (Units of measure)

To change the unit of measure for normalized counts in the Data Table, first check the **Show Normalized Counts** check box to display the normalized particle data and then select "p/m^3" or "p/ft^3" from the "Norm. Counts" pull down list. The Data Table updates and displays the normalized counts in the selected unit of measure.

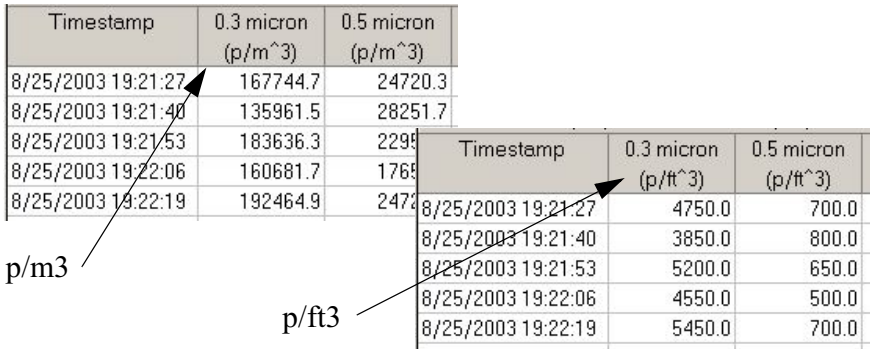


Figure 4-30 Normalized Counts (Units of Measure)

Sample Time (units of measure)

To change the unit of measure for sample time data in the Data Table, first check the **Show Sample Time** check box to display Sample Time data and then select "seconds", "minutes" or "hours" from the "Sample Time" pull down list. The Data Table updates and displays the Sample Time data in the selected unit of measure.

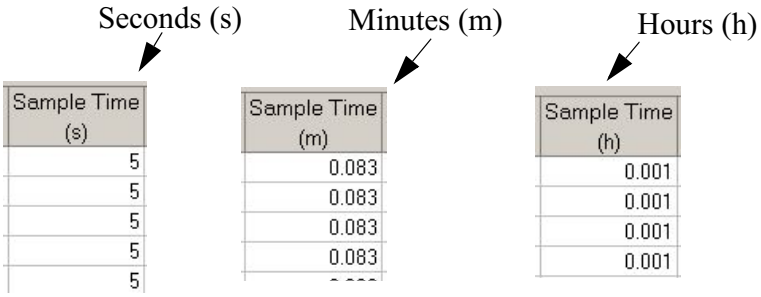


Figure 4-31 Sample Time (units of measure)

Sample Volume (units of measure)

To change the unit of measure for sample volume data in the Data Table, first check the "Show Sample Volume" check box to display Sample Volume data and then select "cubic feet", "cubic meters" or "liters" from the "Sample Volume" pull down list. The Data Table

updates and displays the Sample Volume data in the selected unit of measure.

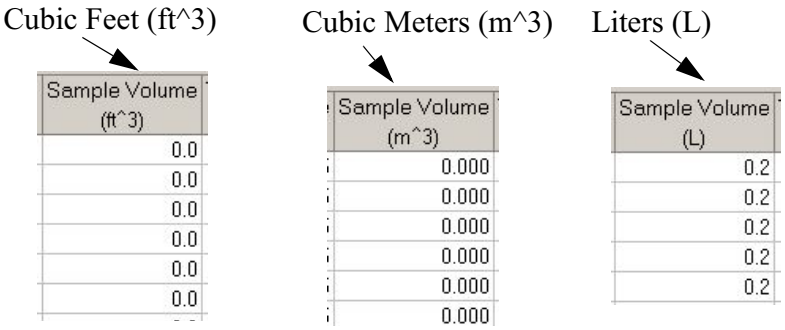


Figure 4-32 Sample Volume (units of measure)

IAQ Instrument Data

After downloading data from an IAQ instrument, two new checkboxes will appear in the Particle section. They are **Show Mass Concentrations** and **Show PM and TPM Values**.

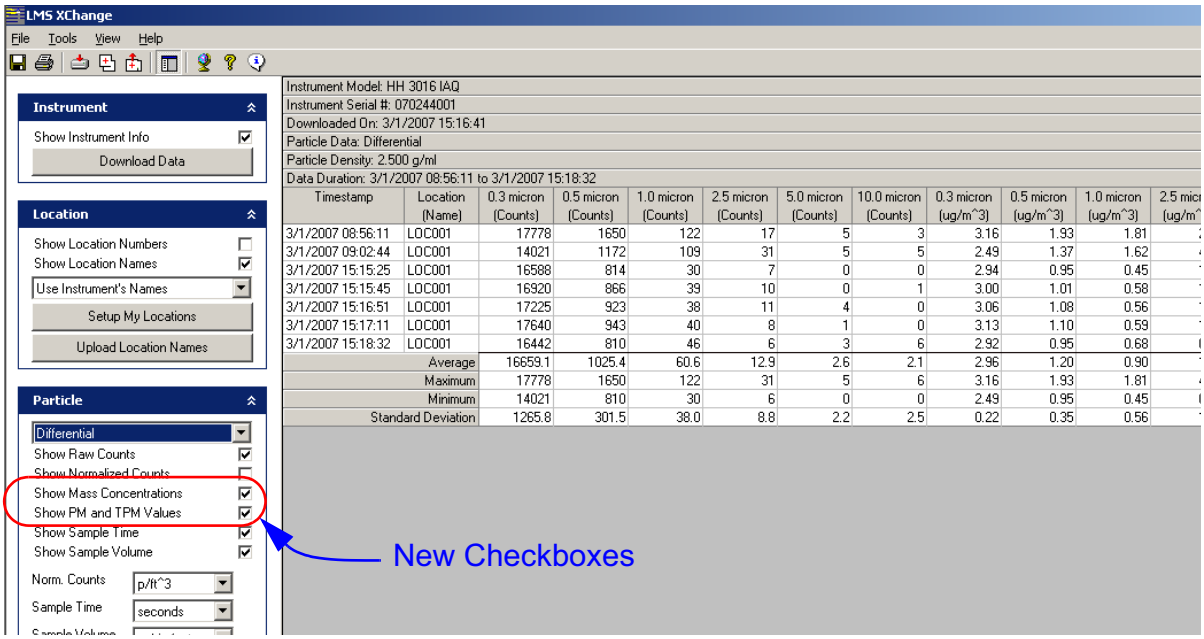


Figure 4-33 New Checkboxes Main Screen

Show Mass Concentrations

To display mass concentrations, check the **Show Mass Concentrations** check box. The Data Table will update and display columns containing mass concentrations for each particle channel size. This data will always display in Differential mode, even when the drop down menu

box is set to Cumulative. Data units are always displayed in micrograms per cubic meter (ug/m^3).

Show PM and TPM Values

To display Particulate Matter (PM) and Total Particulate Matter (TPM), choose the **Show PM and TPM Values** check box. The Data Table will update and display PM columns for each particle channel size, except the first. A TPM column is displayed after the last PM column. The data displayed is unaffected by the Differential/Cumulative drop down menu box. Data units are always displayed in micrograms per cubic meter (ug/m^3).

Environmental

The Environmental section of the Configuration Bar allows you to display additional environmental data in the Data Table and/or change the associated units of measure.

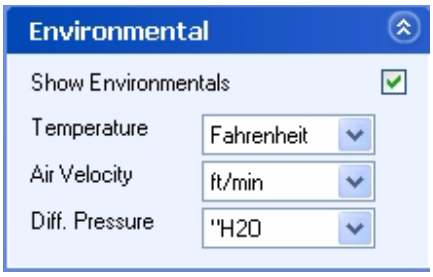


Figure 4-34 Environmental information

Show Environmentals

Note: *HANDHELD instruments can record temperature and relative humidity data. SOLAIR instruments can record temperature, relative humidity, air velocity and differential pressure data. To record environmental data, the appropriate probe(s) must be attached and analog channels enabled on the instrument.*

To show environmental data, select the "Show Environmentals" check box. The Data Table updates and displays the available environmental data..

Temperature (F)	Relative Humidity (%)
80.0	43.2
80.0	44.0
80.0	43.8
80.0	43.7
79.5	43.4
80.0	44.0

Figure 4-35 Show Environmentals (HANDHELD instrument)

Temperature (units of measure)

To change the unit of measure for temperature data, first check the "Show Environmentals" check box to display environmental data and then select "Fahrenheit", "Celsius" or "Kelvin" from the "Temperature" pull down list. The Data Table updates and displays the temperature data in the selected unit of measure.

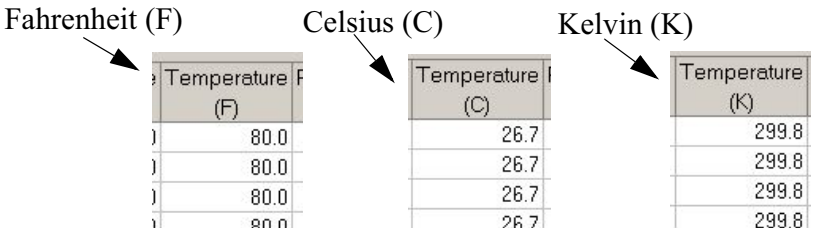


Figure 4-36 Temperature (units of measure)

Air Velocity (units of measure)

Note: *SOLAIR instruments can record air velocity and differential data if the appropriate probes are attached and enabled. HANDHELD instruments cannot record air velocity or differential data.*

To change the unit of measure for air velocity data, first check the "Show Environmentals" check box to display environmental data and then select "ft/min" or "m/sec" from the "Air Velocity" pull down list. The Data Table updates and displays the air velocity data in the selected unit of measure.

Diff. Pressure (units of measure)

To change the unit of measure for differential pressure data, first check the "Show Environmentals" check box to display environmental data and then select a unit of measure from the "Diff. Pressure" pull down list. The Data Table updates and displays the differential data in the appropriate unit of measure.

Data Status

When data is recorded on the instrument under compromised conditions, such as insufficient flow or laser voltage, it is displayed on the Data Table in a different color so that you can easily identify it.

Data Status colors are as follows in order of priority:

Note: *Bad Laser's color takes priority over bad flow's color. If data is under both bad laser and bad flow conditions, the data will be colored purple (bad laser) on the Data Table.*

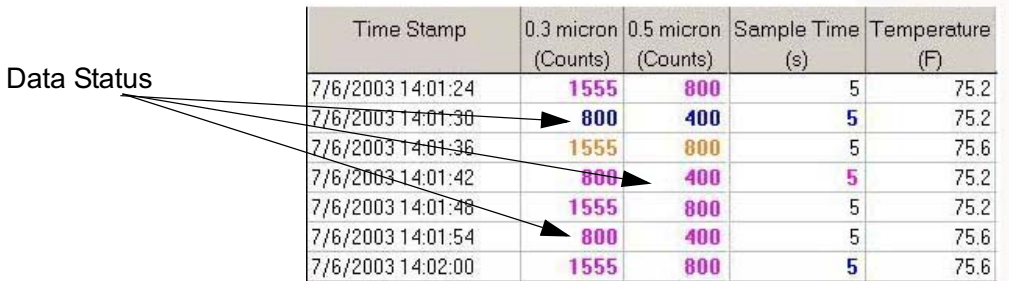
1) Instrument malfunction (purple)

2) Bad laser (purple)

3) Bad flow (blue)

4) Overflow (orange) - Overflow occurs when particle counts on the instrument exceed its maximum count.

For Example:



Time Stamp	0.3 micron (Counts)	0.5 micron (Counts)	Sample Time (s)	Temperature (F)
7/6/2003 14:01:24	1555	800	5	75.2
7/6/2003 14:01:30	800	400	5	75.2
7/6/2003 14:01:36	1555	800	5	75.6
7/6/2003 14:01:42	800	400	5	75.2
7/6/2003 14:01:48	1555	800	5	75.2
7/6/2003 14:01:54	800	400	5	75.6
7/6/2003 14:02:00	1555	800	5	75.6

Figure 4-37 Data Table Showing Data Status

If any compromised data is displayed during a given time range, the summary section of the Data table also reflects the compromised data.

Average	1199.7	143964.7	611.8	73411.8	75.5	5.0
Maximum	1555	186600.0	800	96000.0	76.1	5
Minimum	800	96000.0	400	48000.0	75.2	5
Standard Deviation	388.4	46613.3	205.8	24695.8	0.4	0.0
Instrument Malfunction	Yes	Yes	Yes	Yes	NA	Yes
Flow Status	Bad	Bad	Bad	Bad	NA	Bad
Laser Status	Bad	Bad	Bad	Bad	NA	NA
Instrument Overflow	Yes	Yes	Yes	Yes	NA	NA

Figure 4-38 Data Table Summary section

To see details about the data's status, place your cursor over any cell in the Data Table or its summary section that contains compromised data. The data's status' appears in a tooltip.

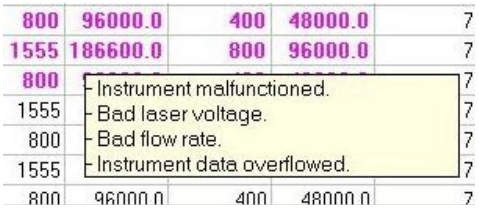


Figure 4-39 Data Status tool tip

Data Status tooltip messages include:

- Instrument malfunctioned.

- Bad laser voltage.

- Bad flow rate.

- Instrument data overflowed.

Printing

Print the displayed Data Table by clicking on the Print button on the toolbar.

On the default print window select a printer and click OK to print the Data Table.

Saving Data

Data from LMS XChange can be saved to several different file types: HTML (*.html,*.htm), Microsoft Excel™ (*.xls) or Comma Separated Value (*.csv) files.

1. Download data and view the Data Table.

2. Click the Save As button,

This action brings up the following dialog box:

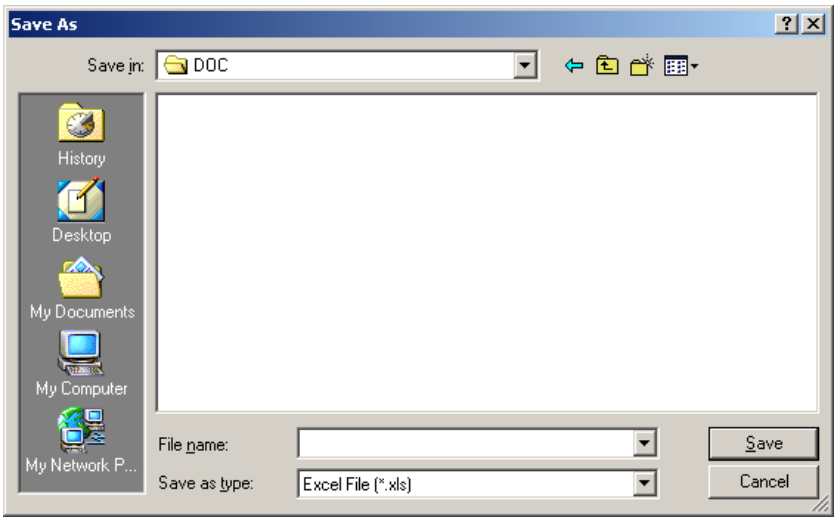


Figure 4-40 Save Data Table

3. Use the navigation tools at the top of the dialog box to select a directory into which to save the file.

4. Enter a name in the “File Name” field.

5. Select which file type to save it as: *.xls, *.html or *.csv.

6. Click on Save to save.

Once saved to a Microsoft Excel or comma separated value format, the data can be manipulated and formatted using the standard Microsoft Excel functions.

Please refer to the Microsoft Excel manual for further information.

5 IAQ Instrument Setup

Overview

This chapter describes the IAQ Instrument Setup wizard.

Procedure

Attach the Communications cable to the IAQ instrument Data port. Start the XChange program and, from the Main menu, choose Tools, Setup IAQ Instrument. Turn the instrument ON.

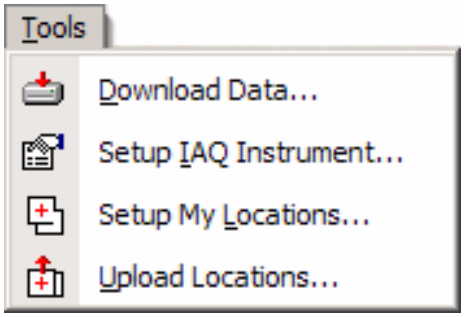


Figure 5-1 Tools Drop Down Menu

1. At the next screen, click **Next** to continue or **Cancel** to cancel.

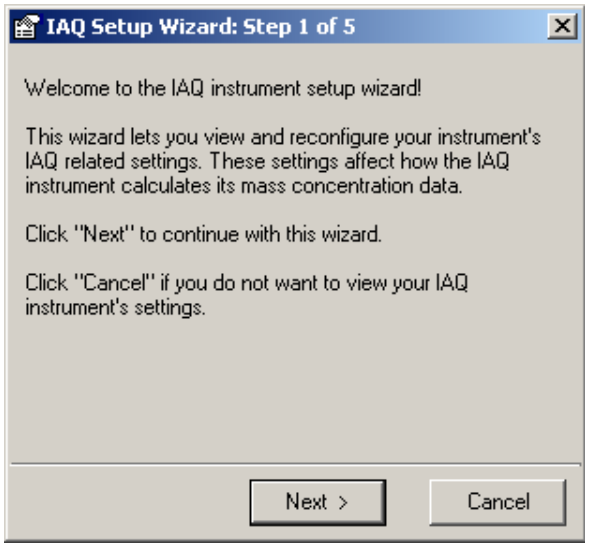


Figure 5-2 IAQ Setup Step 1

2. At the next screen, verify that the COM port shown in the Drop down is correct and change it if needed. If a USB-RS232 converter will be used, make sure it is connected and the driver installed before attempting to use it to connect to the instrument. Choose its COM port (usually higher COM numbers such as 5 or 6). The illustration in Figure 5-3 shows the Default COM 1.

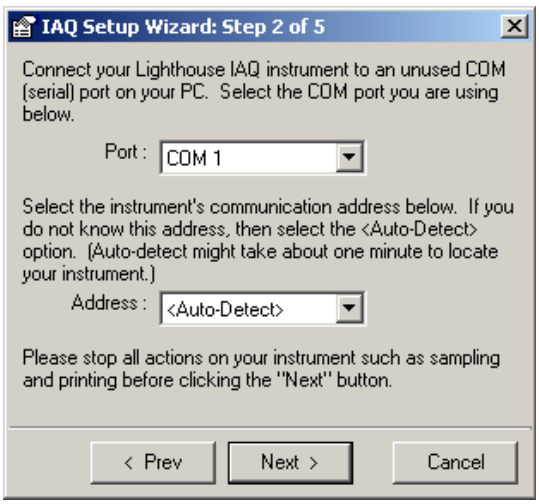


Figure 5-3 IAQ Setup Step 2

3. Make sure the instrument is ON and click **Next** to continue or **Cancel** to cancel.

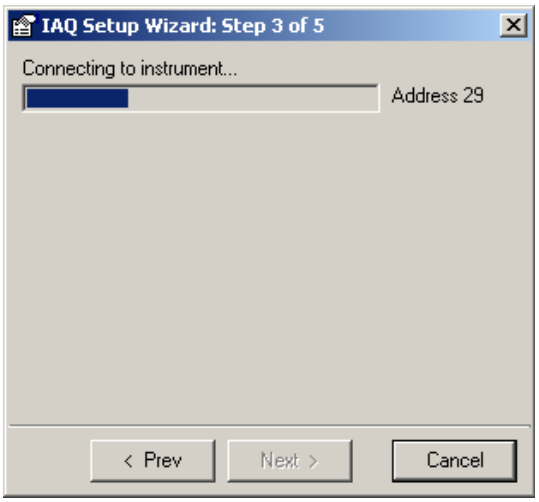


Figure 5-4 IAQ Setup Step 3

4. Allow the program to search for the instrument. If the software cannot find the instrument, make sure the correct port is chosen, the cable is solidly attached at both ends and the instrument is turned ON. If it continues to fail, contact Lighthouse Technical Support for assistance.

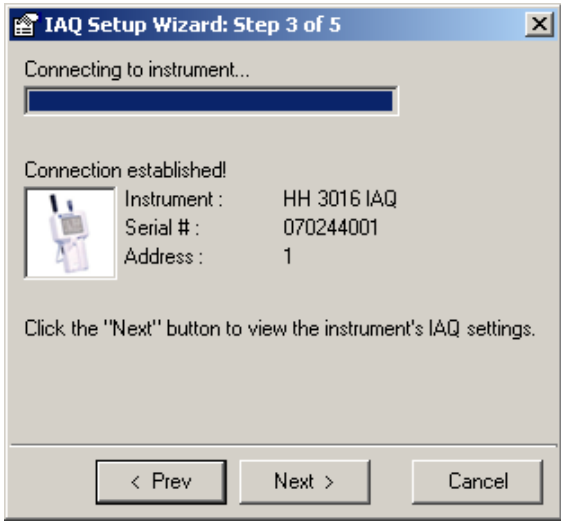


Figure 5-5 IAQ Setup Step 3 Success

5. When the instrument has been found, the software will display the instrument type, serial number and address (typically 1). Click **Next** to continue and display the IAQ settings or **Cancel** to cancel.

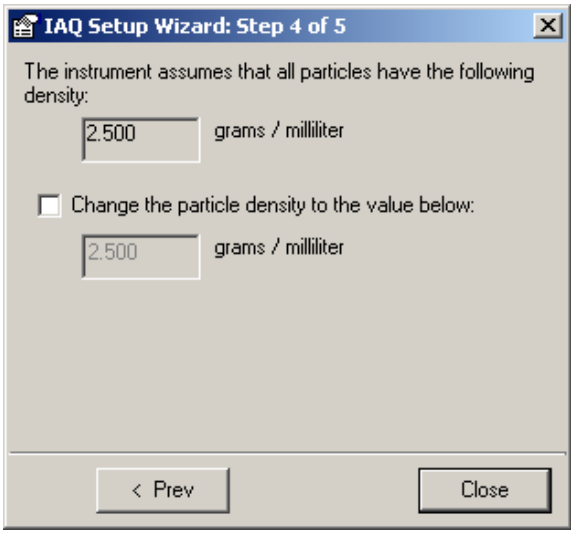


Figure 5-6 IAQ Setup Step 4

6. To change the particle density value, click **Change the particle density to the value below:**

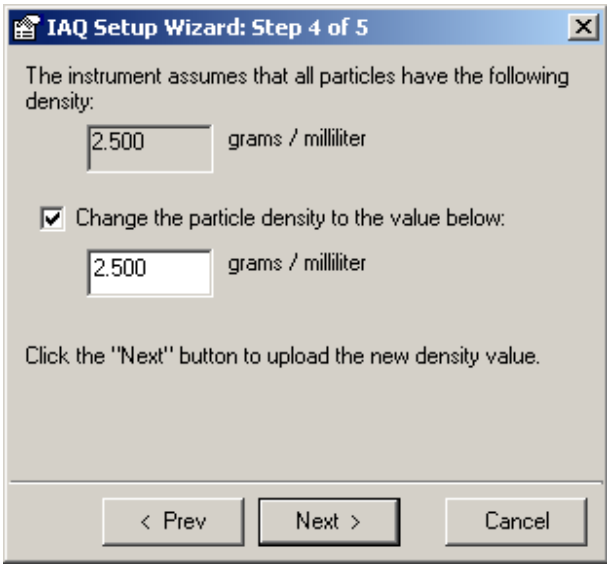


Figure 5-7 Particle Density Change Screen

7. The default value used by the IAQ Handheld for the particle density is the same as carbon, 2.500 grams per milliliter. Values allowed are from 0.001 to 9.999, illustrated in Figure 5-8.

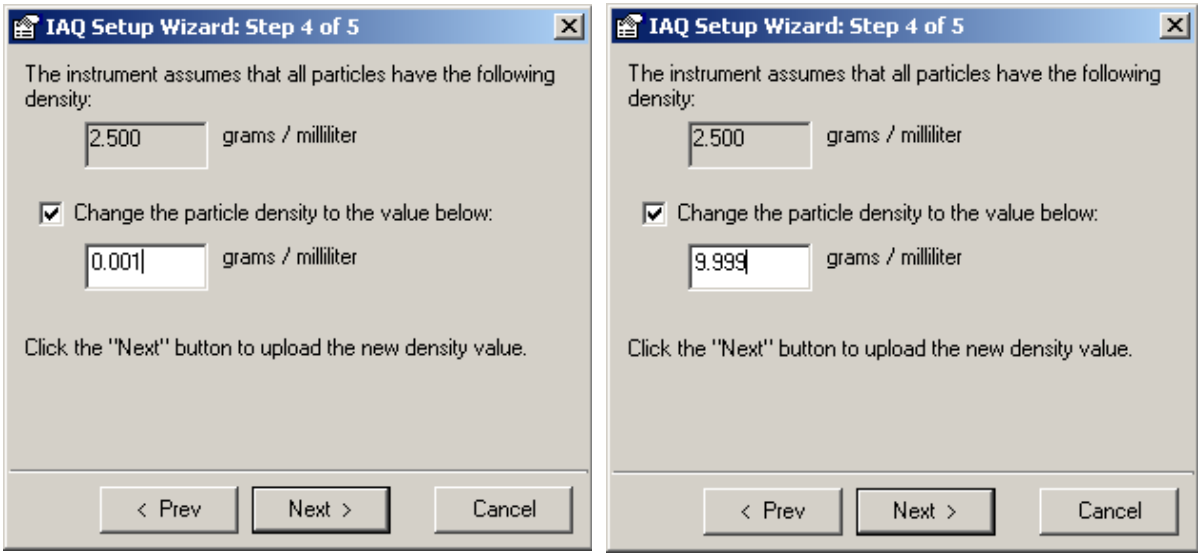


Figure 5-8 Minimum and Maximum Values

8. Click **< Prev** to go back, **Next >** to continue or **Cancel** to cancel the operation.

9. When the desired value is entered, click the **Next** button to write this value to the IAQ and proceed to Step 5 (Figure 5-9).

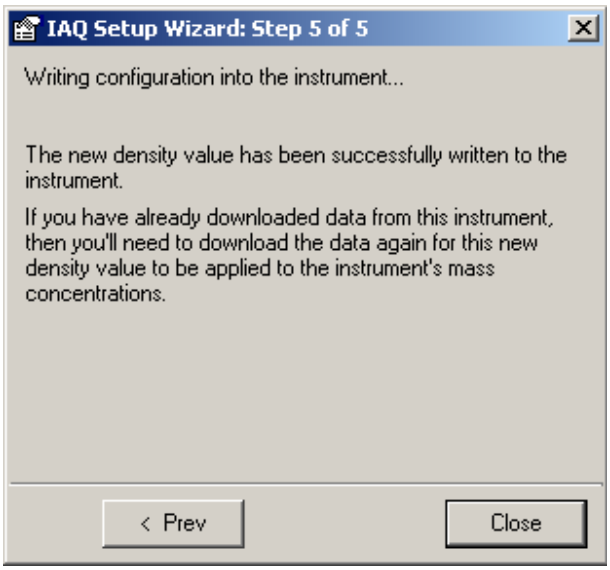


Figure 5-9 Configuration Change Confirmation Screen

10. Click **Close** to close the window and return to the program Main screen.

11. See “IAQ Instrument Data” on page 4-17. and review IAQ data view options.

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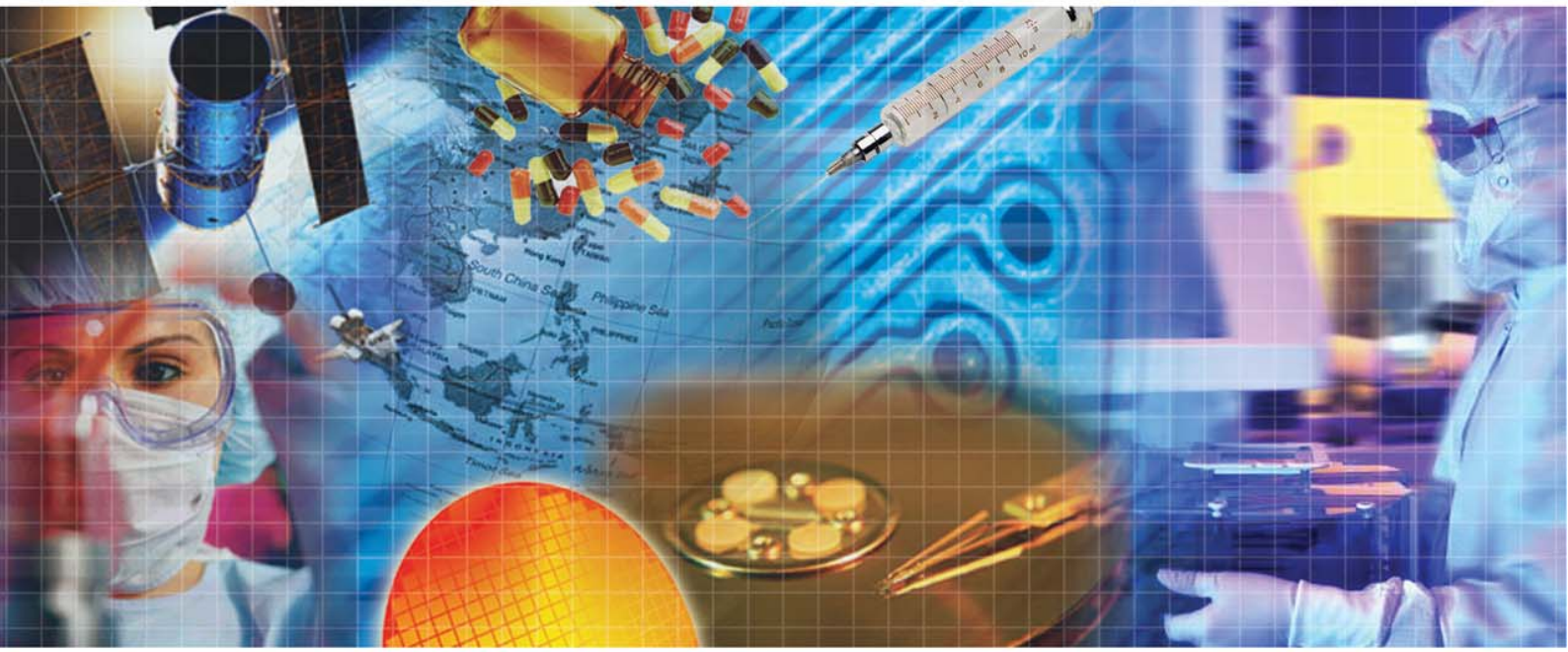

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