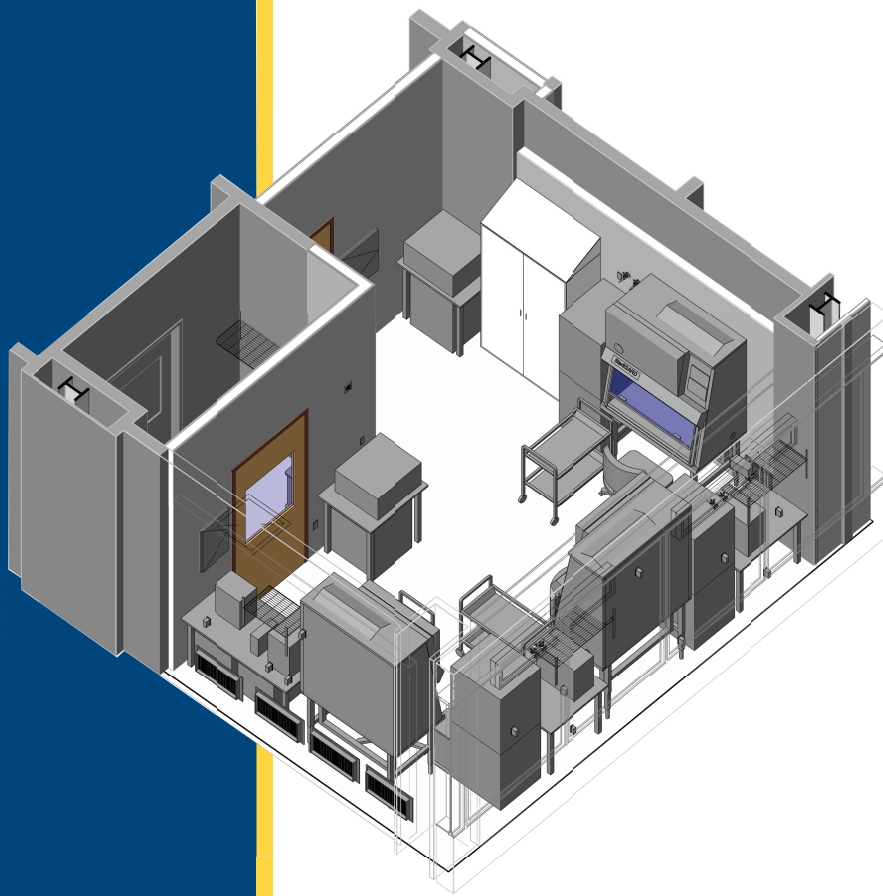









# LMSExpress

MONITORING SOFTWARE



-  Real time particle counting
-  Temperature
-  Relative humidity
-  Differential pressure
-  Air velocity
-  Portable particle counter
-  Door status
-  CO<sub>2</sub> levels
-  Microbial samplers
-  O<sub>2</sub> levels

## Operators Manual



# **Lighthouse Worldwide Solutions**

LMS Express

LMS Express and LMS Express RT

## **Operators Manual**

Copyright © 2002-2020 by Lighthouse Worldwide Solutions. All rights reserved. No part of this document may be reproduced by any means except as permitted in writing by Lighthouse Worldwide Solutions.

Any difficulties encountered when running other programs in conjunction with LMS Express and LMS Express RT will not be supported by Lighthouse Worldwide Solutions.

The information contained herein is subject to change without notice. Lighthouse Worldwide Solutions is not responsible for any damages arising out of your use of the LMS Express and/or LMS Express RT program.

LMS Express™ is a trademark of Lighthouse Worldwide Solutions.

Piccolo.NET BSD License Copyright (c) 2002, University of Maryland, All rights reserved.

Microsoft®, Microsoft Windows™ and Excel™ are trademarks of Microsoft Corporation. LWS

Part Number: 248083470-1 Rev 2



# About This Manual

This manual describes LMS Express and LMS Express RT monitoring systems and their usage. These monitoring systems are designed to download and analyze data from ApexPortable, ApexRemote, ApexZ, Vertex50, Remote, SOLAIR and Handheld Particle Counters, 6 and 32 Position Manifold Controllers, ICP/DAS Modules, and Remote Active Counts.

## Audience

---

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

**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 of data.

This manual is written for users who want to monitor the conditions in their cleanroom or environment.

For this manual where the discussion refers to feature(s) found in both versions of LMS Express (LMS Express and LMS Express RT) the two versions of LMS Express will be referred to collectively as **LMS Express** or **Express**.

If you need additional or expanded monitoring capabilities, or a multi-user monitoring system, please call your Lighthouse Worldwide Solutions sales representative for information about the full scale Lighthouse Monitoring System (LMS).

## Software License Agreement

---

SOFTWARE PROGRAM: LMS Express (LMS Express 8 and LMS Express 8 RT).

IMPORTANT - THIS IS A LEGAL AGREEMENT BETWEEN YOU (EITHER AN INDIVIDUAL OR AN ENTITY) AND LIGHTHOUSE WORLDWIDE SOLUTIONS. BY INSTALLING AND/OR USING THE SOFTWARE, YOU ACKNOWLEDGE THAT YOU HAVE READ THIS LICENSE AGREEMENT, UNDERSTAND IT and AGREE TO BE BOUND BY ITS TERMS. YOU FURTHER AGREE THAT IT IS THE FULL AND COMPLETE AGREEMENT BETWEEN US, SUPERSEDING ALL PRIOR WRITTEN OR VERBAL AGREEMENTS OF ANY KIND. IF YOU DO NOT UNDERSTAND OR DO NOT AGREE TO THE TERMS OF THIS AGREEMENT, YOU MUST CEASE USING THIS PRODUCT IMMEDIATELY AND PROMPTLY RETURN ALL MATERIALS (INCLUDING DISK(S) AND WRITTEN MATERIALS) TO LIGHTHOUSE WORLDWIDE SOLUTIONS.

1. GRANT OF LICENSE. This License Agreement permits you to use one copy of the above mentioned Lighthouse Worldwide Solutions software program (the "SOFTWARE") on a single computer. The SOFTWARE is in "use" on a computer when it is loaded into temporary memory (i.e. RAM) or installed into permanent memory (e.g. hard disk, CD-ROM, or other storage device) of that computer. However, installation on a network server for the sole purpose of internal distribution shall not constitute "use" for which a separate license is required, provided you have a separate license for each computer to which the SOFTWARE is distributed.

2. COPYRIGHT. The SOFTWARE is owned by Lighthouse Worldwide Solutions or its suppliers and is protected by United States copyright laws and international treaty provisions. Therefore, you must treat the SOFTWARE like any other copyrighted material (e.g. a book or musical recording) except that you may either

(a) make one copy of the SOFTWARE solely for backup or archival purposes, or (b) transfer the SOFTWARE to a single hard disk provided you keep the original solely for backup or archival purposes. You may not copy the written materials accompanying the SOFTWARE.

3. OTHER RESTRICTIONS. You may not rent or lease the SOFTWARE, but you may transfer the SOFTWARE and accompanying written materials on a permanent basis provided you retain no copies and the recipient agrees to the terms of this Agreement. You may not reverse engineer, decompose, or disassemble the SOFTWARE. If the Software is an update or has been updated, any transfer must include the most recent update and all prior versions.

#### LIMITED WARRANTY

LIMITED WARRANTY. This program is provided "as is" without any warranty of any kind, either expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. The entire risk as to the quality and performance of the SOFTWARE is with you, the licensee. Should the SOFTWARE prove defective, you assume the risk and liability for the entire cost of all necessary repair, service, or correction. Some states/jurisdictions do not allow the exclusion of implied warranties, so the above exclusion may not apply to you. This warranty gives you specific legal rights and you may have other rights which vary from state/jurisdiction to state/jurisdiction. Lighthouse Worldwide Solutions does not warrant the functions contained in the SOFTWARE will meet your requirements, or that the operation of the SOFTWARE will be error-free or uninterrupted. Lighthouse Worldwide Solutions does warrant that the disk(s) on which the program is furnished shall be free from defects in materials and workmanship for a period of ninety (90) days from the date of purchase, so long as proof of purchase is provided.

CUSTOMER REMEDIES. Lighthouse Worldwide Solutions' and its suppliers' entire liability and your exclusive remedy shall be, at Lighthouse Worldwide Solutions' option, either (a) return of the price paid, or (b) repair or replacement of the SOFTWARE that does not meet Lighthouse Worldwide Solutions' Limited Warranty and which is returned to Lighthouse Worldwide Solutions with proof of purchase. This Limited Warranty is void if failure of the SOFTWARE has resulted from accident, abuse, or misapplication. Any replacement SOFTWARE will be warranted for the remainder of the original warranty period or thirty (30) days, whichever is longer. Neither these remedies nor any product support services are available outside the United States without proof of purchase from an authorized non-U.S. source.

NO OTHER WARRANTIES. To the maximum extent permitted by applicable law, Lighthouse Worldwide Solutions and its suppliers disclaim all other warranties, either express or implied, including, but not limited to, implied warranties of merchantability and fitness for a particular purpose, with regard to the SOFTWARE, the accompanying written materials and any accompanying hardware. This limited warranty gives you specific legal rights. You may have others which vary from state/jurisdiction to state/jurisdiction.

NO LIABILITY FOR CONSEQUENTIAL DAMAGES. To the maximum extent permitted by applicable law, in no event shall Lighthouse Worldwide Solutions or its suppliers be liable for any damages whatsoever (including, without limitation, damages for loss of business profits, business interruption, loss of business information, or any other pecuniary loss) arising out of the use or inability to use this Lighthouse Worldwide Solutions product, even if Lighthouse Worldwide Solutions has been advised of the possibility of such damages or for any claim by any other party. Because some states/jurisdictions do not allow the exclusion or limitation of liability for consequential or incidental damages, the above limitation may not apply to you.

U.S. GOVERNMENT RESTRICTED RIGHTS. The SOFTWARE and documentation are subject to export controls under the United States Export Administration Act, as amended, which prohibits exports of certain commodities and technical data, including software, to specified countries. You hereby certify that neither the SOFTWARE nor the documentation will be transmitted or forwarded outside of your country.

If you acquired this product in the United States, this Agreement is governed by the laws of the State of California. Should you have any questions concerning this Agreement, or if you desire to contact Lighthouse Worldwide Solutions for any reason, you may write to

Lighthouse Worldwide Solutions 47300  
Kato Road, Fremont, CA 94538 USA

***Piccolo.NET BSD License***

---

***Copyright (c) 2003-2004, University of Maryland All  
rights reserved.***

*Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:*

*Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution. Neither the name of the University of Maryland nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.*

*THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.*

## Additional Help

---

For more information about LMS Express or LMS Express RT, contact Lighthouse Worldwide Solutions.

(800) 945-5905	Sales and Service
(541) 770-5905	Outside of USA

[techsupport@golighthouse.com](mailto:techsupport@golighthouse.com)

[www.golighthouse.com](http://www.golighthouse.com)

**Blank page**

## Table of Contents

About This Manual.....	5
Audience .....	5
Software License Agreement.....	5
Additional Help .....	7
Chapter 1   Overview .....	15
Basic Concepts .....	17
Features .....	18
Full Screen.....	18
Graphs.....	18
Data Tables .....	18
Standard Reports .....	19
Data Status.....	19
Maps .....	19
Alarm Status and Alarm Acknowledgement.....	19
Alarm Groups.....	19
Data Sets.....	20
Instrument Setup.....	20
Location Setup .....	20
Database Maintenance.....	20
Instrument Download.....	20
Users .....	21
Event Log .....	21
Application Properties .....	21
Chapter 2   Getting Started .....	23
Installation .....	23
Startup .....	24
Licensing Operations During Startup.....	24
Setup Wizard .....	26
Login .....	28
Splash Screen.....	28
Main Window .....	29
Basic User Interface .....	29

View .....	30
Status Bar .....	30
Navigation.....	31
Toolbar .....	31
Menu.....	35
Task Panel .....	37
Navigation Panel .....	37
Shutdown.....	39
Express Shutdown.....	39
Express RT Shutdown.....	39
Express RT Shutdown (real time data active) .....	39
Chapter 3   Graphs.....	41
Graphs.....	41
Sort Criteria.....	41
Task Panel .....	43
Tool Bar Buttons .....	44
Displaying a New Graph.....	45
Displaying Existing Graphs.....	51
Graph Display Features.....	52
Printing .....	55
Printing Graph.....	55
Exporting Data .....	55
Export Graph.....	55
Chapter 4    Data Tables .....	57
Data Tables .....	57
Sort Criteria.....	58
Task Panel .....	59
Tool Bar Buttons .....	60
Creating a New Data Table .....	61
Displayed Decimals and Units.....	67
Displaying Existing Data Tables.....	67
Printing .....	68

Printing Data Table.....	68
Exporting Data .....	68
Exporting Data Tables .....	68
Chapter 5    Maps .....	69
Maps .....	69
Sort Criteria.....	70
Task Panel .....	71
Tool Bar Buttons .....	72
Displaying a New Map .....	73
Displaying Existing Maps.....	79
Map Real Time Status View .....	80
Printing Maps.....	82
Export Map Data.....	83
Chapter 6    Report Display.....	85
Standard Reports .....	85
Report View .....	85
Sort Criteria.....	86
Task Panel .....	87
Tool Bar Buttons .....	88
Displaying Report Data .....	88
Report Display.....	91
Federal Standard 209E.....	97
ISO 14644-1 Report .....	100
British Standard 5295 Report .....	104
EU GMP Annex 1 Report.....	106
Printing Standard Report.....	108
Exporting Standard Reports.....	108
Chapter 7    Status and Alarms.....	109
Real Time Status .....	109
Real Time Data Status.....	110
Real Time Alarm Group Status .....	112
Alarms.....	113

Adding and Modifying Alarm Triggers .....	114
Text .....	114
Conventions .....	114
Alarm Groups .....	119
Alarms and Warnings Log .....	122
Viewing Alarm Status .....	125
Acknowledging Alarms .....	128
Enable/Disable Alarm Acknowledgement .....	130
Predefined Acknowledgement Messages .....	131
Chapter 8 LMS Express Web Client .....	133
Home Screen .....	133
Filter Home Page Datasets .....	135
Users Screen .....	136
Filter Username List .....	137
Unacknowledged Alarms .....	138
Filter Unacknowledged Alarms List .....	139
Alarm List .....	140
Filter Alarm List .....	141
Event Log .....	142
Filter Event Log .....	143
Reports .....	144
Alarm Report .....	145
Configuration Report .....	146
Conformance Report .....	147
Chapter 9 System Setup .....	149
Administrator Options .....	149
Unit Conversion and Other Application Properties .....	149
Units .....	150
Sample Time .....	151
Displaying Units .....	152
Signatures .....	153
Calculation Settings .....	155



Other Properties .....	156
User Logins.....	165
Notifications.....	169
Instruments.....	176
Locations.....	178
Upload Location Names to Instrument .....	181
Event Log .....	185
Database Maintenance.....	189
Chapter 10 Data Collection.....	197
Downloading Data Manually .....	197
ApexZ Serial Driver Install.....	197
Operating Systems.....	198
Update Software Driver .....	198
Download Data from ApexZ Instruments .....	200
Download data from Lighthouse instruments.....	203
Trouble Shooting .....	207
Import Data.....	208
Data Import Wizard .....	209
Real Time Data Collection.....	213
Real Time Configuration .....	213
Instrument Tree.....	214
Configuration Setup.....	215
Chapter 11 Configuration Manager.....	246
Configuration Manager Home Screen .....	247
Find ApexZ instrument .....	248
Add or edit room name and included locations .....	251
Add or Edit Recipes.....	253
Edit Recipe Type .....	254
Edit Recipe Channels .....	255
Edit Recipe Sample Settings.....	256
Edit Recipe's Room and Locations.....	257
Edit Instrument Locations.....	258

Add a New User .....	259
Local User .....	260
AD User – Active Directory .....	260
Edit a User.....	261
Edit Comms.....	262
Print Comms .....	262
USB Comms.....	263
Edit Settings .....	264
Time settings.....	264
Options .....	265
About .....	266
Save all Settings .....	267
Download configuration from ApexZ instrument .....	268
Modify Saved ApexZ Configuration .....	269
Rooms .....	270
Recipes.....	271
Locations.....	272
Users .....	273
Upload new configuration to ApexZ instrument.....	274
 Appendix A .....	 267

# Chapter 1 Overview

**Express (LMS Express and LMS Express RT)** monitoring systems are designed for use with Lighthouse instruments such as the ApexPortable, ApexRemote, ApexZ, Vertex50, Solair, Handheld and Remote Particle Counters, Manifold Controllers, ICP/DAS Modules and Remote Active Counts.

**Note:** For this manual, where the discussion refers to feature(s) found in both versions of LMS Express (LMS Express and LMS Express RT) they will be referred to collectively as Express.

Both versions of **Express** allow you to manually download the data collected by these instruments and view it in graphs, data tables and standard reports.

Data can be automatically collected in real time so that you can analyze the live data with **LMS Express RT**.

**Express** has the following features:

- **LMS Express RT** allows users to configure and collect real time data from up to 100 data points, including any combination of particle counting instruments, Mini-Multiplexers, ICP/DAS Modules and 6 or 32-Port Manifold Controllers.
- Both versions of **Express** allow users to manually download data.
- Both versions of **Express** allow users to import data files output via Solair, ApexP or ApexZ flash drive ports.
- **Express** auto-detects Lighthouse particle counters on the system's COM ports, TCP/IP or Wi-Fi without special port or driver configuration requirements.
- All versions of **Express** allow users to display and print the following cleanliness standards reports:
  - ISO-14644-1, 1999 and 2015 revisions,
  - Federal Standard 209E (ft.),
  - Federal Standard 209E (m),
  - British Standard 5295,
  - EU GMP Annex 1, 2003 revision and 2009 revisions.
- Minimal setup is required to begin collecting real time data with LMS Express RT.

- Allows users to display a Graph or Data Table for a specified time range.
- **LMS Express RT** users can also view a rolling graph and data table, real time maps, data status and alarm log.
- **LMS Express RT** can be set up to be 21 CFR part 11 compliant.
- Each version includes three levels of user accounts - regular users, power users and administrative users. Only administrative users can create other user accounts.
- Logins can be enforced, meaning **Express** can be configured so that it will not start unless a user has logged in.
- Password aging - **Express** passwords can be set to expire after a selectable number of days.
- Automatically log off a user (Auto-Logout) - if **Express** detects that the software has not been used for a user-defined period of time.
- Print data from a graph or export it to a bitmap (\*.bmp), JPeg (\*.jpg) or one of several other file types.
- A data table or report can be printed or exported to a Microsoft Excel file (\*.xls) or comma separated value file (\*.csv).
- Perform basic database maintenance features such as archive and delete.
- Synchronizes the clocks of the instrument(s) connected to it weekly.
- Uses Window's regional settings for displaying localized dates and decimal numbers.
- Tracks logins, logouts, additions, updates, deletes, downloads, archives, etc., in an event log. The event log updates on a real time basis.
- **LMS Express RT** can host an OPC DA server that exports all real time collected data.

## Basic Concepts

---

Terms and concepts important to **Express** are explained below.

**Data Sets:** A data set is a collection of related data points based on instrument, location, date/time, channel and type of data. Data sets are automatically created when data is downloaded from the instrument.

**Instrument:** Typically Lighthouse particles counters. **Express** supports getting data from ApexPortable, ApexRemote, ApexZ, Vertex50, Solair, Remote, Handheld, and the Lighthouse 6 and 32 port Manifold Controller. Instruments are identified by their model. You can assign the instrument an alias that will be displayed throughout **Express**.

**Manifold Controller:** A manifold system from Lighthouse that consists of an intelligent Manifold Controller, a Universal Manifold and a Lighthouse particle counter. The Manifold controller can sample from up to 32 locations, with separate hold and purge times for each one.

**Room:** ApexZ instruments allow locations to be assigned to a Room Name. When Express imports data from ApexZ the Room Name and the Location Name on the ApexZ will be saved in Express as a new location name [Room+Location] independent of the standard 999 Express location names.

**Location:** Numbers assigned by the instrument to represent different areas where samples were taken. In **Express**, the numeric location number downloaded from an instrument can be assigned a descriptive alphanumeric name.

**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.

**Channel:** Channels are only used by environmental sensors. A channel number indicates the physical connector to which the environmental sensor is attached.

**Class:** Cleanrooms are designated certain “class” levels based on the level of cleanliness required for the particular industry.

## Features

---

### Full Screen

**LMS Express** and **Express RT** use **Windows'** screen features, such as, minimize, restore, close and maximize screen. For the convenience of the user, an additional Full Screen button has been added to the program's toolbar that performs a similar function to the 'maximize window' button, expanding the program screen to replace the entire screen contents, including **Windows'** taskbar and side bar. Clicking this button (Figure 1-1 top) maximizes the program screen to occupy the full screen.

To restore the screen to the normal **Windows'** screen, click the button shown in the bottom of Figure 1-1.

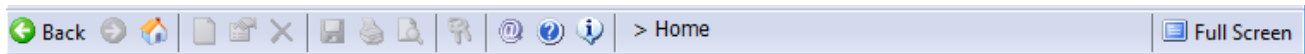


Figure 1-1 LMS Express and RT Toolbar

### Graphs

The Graph view allows you to see your data for a specified date/time range displayed as a line graph. Each data set is represented with a different color. The graph can be printed or exported to several different formats, including bitmap (\*.bmp) file and JPEG (\*.jpg). Graphs can be rolling (for **LMS Express RT**) or for a fixed date and time (all versions of **Express**).

### Data Tables

The Data Table view allows you to display data in a table format. Each data set displays statistics (Standard deviation, Average, Maximum data point, Minimum data point) calculated for the range of data displayed. Data Tables can be printed or exported to Microsoft Excel \*.xls or \*.csv (comma separated values) files. Data tables can be rolling (for **LMS Express RT**) or for a fixed date and time (all versions of **Express**).

### Standard Reports

The following Cleanliness Standards reports can be run: Federal Standard 209E (ft), Federal Standard 209E (m), ISO 14644-1 (1999 revision), ISO 14644-1 (2015 revision), British Standard 5295, EU GMP Annex 1 (2003 revision) and EU GMP Annex 1 (2009 revision).

Each report calculates the classification of the data based on the standard chosen. A displayed report can be printed or exported to a Microsoft Excel (\*.xls) or comma separated file (\*.csv) file.

### Data Status

**LMS Express RT** users can view the current real time status of all data filtered by location, instrument, data type and/or alarm group.

### Maps

**LMS Express RT** users can create and display real time maps with each using a distinct bitmap background assigned to it and displaying multiple data sets, alarm groups, and/or instruments. If alarms are enabled, maps will update with current alarm or warning status.

### Alarm Status and Alarm Acknowledgement

**LMS Express RT** administrators can configure alarm triggers to display a warning or alarm when certain conditions occur. Conditions can be programmed for particular locations or instruments. When alarm triggers are enabled, the status bar will show the overall status of the system ("Normal", "Warning" or "Alarm").

Users can acknowledge alarms on the Unacknowledged alarms view and add a note to any transition between normal and alarm or warning on the Alarms and Warnings Log view.

### Alarm Groups

Alarm Groups allow **LMS Express** users to quickly see the worst status out of a sub-set of data sets. Alarm groups can be tied to an instrument's relays to display the status of a particular area. An alarm group can also be used to display a grouped status in Maps and in the Real-Time Alarm Group Status screen so that these screens display a specific set of data.

### Data Sets

Data set information (instrument name, location name, channel and data type) can be displayed on graphs and data tables. You can decide which parts of the Data Set Name you wish to display.

### Instrument Setup

By default, the “name” of the instrument is its model name. The first time an instrument uploads data to **Express**, the application will record the instrument’s serial number and model name. You can give a meaningful name to an instrument to help distinguish it from the others. You can select whether to display the instrument name in the graph and data table or keep it hidden.

### Location Setup

When the data is downloaded to **Express**, the location(s) associated with the data are recorded by their numeric Location ID. By default, the “name” of a location is its numeric ID. You can change the location name to a more meaningful text description and select whether to display the location name in the graph and data table or keep it hidden.

### Database Maintenance

You can archive an **Express** database, open an existing archive database to look at historical data or delete data in the current database. An Automatic Database Maintenance feature can be enabled to clear out expired data at user-configured expiration times.

### Instrument Download

**Express** will detect Lighthouse instruments via any COM port connection, TCP/IP or Wi-Fi (ApexZ). Data can be downloaded manually or real time.

When a manual download is complete, the serial number and model of the instrument, as well as the number of data records downloaded, will be displayed. At the end of a manual data download the user will be given an opportunity to clear the data from the instrument.

When configured to download data real time, **LMS Express RT** will collect data from the instrument(s) at least once every 30 seconds, depending on how the instruments are configured.



### Users

**Express** allows administrator users to create, modify and delete other user accounts. Accounts may have a password and the password can be set to expire after a given amount of time. **Express** can be configured to automatically log users out after a programmable period of idle time. Email and SMS notifications may also be set up to alert users in real-time of current sensor alarm conditions.

### Event Log

All user logins, logouts, data downloaded, archives and changes to **Express** graphs, data tables, standard reports and properties are logged in the event log. Users can view the event log to track what has occurred in the system.

### Application Properties

System parameters that can be set include enabling and disabling signature lines on graphs, data tables and reports; automatic starting of **Express** when Windows starts and selecting what units of measure are displayed.

Blank Page

# Chapter 2      Getting Started

This manual covers features for *LMS Express* or *LMS Express RT*. Where the same feature exists in both versions, the two versions will be referred to collectively as *Express*. Features that are unique to a particular version will name the specific version of *LMS Express*.

This chapter describes the *Express* environment and the operating system requirements necessary to run *LMS Express* or *LMS Express RT*.

## Installation

---

The Minimum PC Requirements are:

- A personal computer with a dual core 1 GHz or higher processor.
- Windows 8.1 Professional, 10 (x32 and 64 bit) operating system, Server 2008, Server 2012, and Server 2016.
- 2 GB of memory or more.
- 250 GB of hard disk space.
- 256 color monitor with an 800x600 resolution.
- Keyboard and mouse.
- Available serial, USB, or Network port for manual data downloads.
- Available serial, USB, or Network port for real-time data collection.
- One USB port for the HASP lock (optional).

To view this manual on-line, Adobe Acrobat Reader must be installed. It is provided on the same CD as **Express**.

**Note:** The *Express* installation program will configure your system such that even if you installed it when logged in as a Windows Administrator, you can login as a Windows low level user and access *Express*.

Install **Express** by inserting the INSTALL CD into the CD drive. The installation program should start automatically. If it does not, run the install program located in the **Express** CD's root directory.

## Startup

---

Once **Express** is installed and the HASP Lock has been plugged in (HASP is used for LMS Express RT users), launch **Express** by double clicking the icon on your desktop:



Figure 2-1 LMS Express 8 Icon Example

Alternately, **Express** can be started by opening the Start Menu, Programs Menu, Lighthouse Worldwide Solutions, and select **LMS Express**.

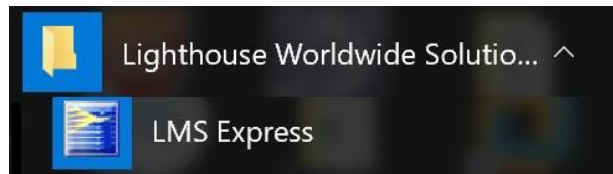


Figure 2-2 Start Menu access to Express

## Licensing Operations During Startup

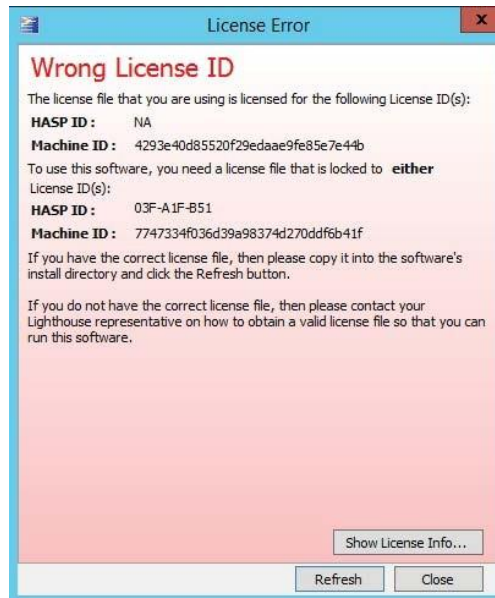
---

From this menu, you can also choose to view this manual in PDF format or to visit the Lighthouse Worldwide Solutions website.

When **Express** is launched, the software looks for the presence of a valid license file '*LMSLicense.lic*' in the Licenses folder at C:\Program Files\Lighthouse Worldwide Solutions\Licenses. This path is for 64 bit operating systems only. If a valid license is present, the software will read the file and license the software accordingly.

If the license file is not present at the default location, the software will try locating the file at "C:\Program Files (x86)\Lighthouse Worldwide Solutions\Licenses". This path is for 32 bit operating systems only. If the license is still not present, the software will read the HASP dongle. If the HASP is not present as well, the software will be licensed as "**Free Version**" for LMS Express.

If an invalid or corrupted license file is located, the license error screen (Figure 2-3) displays:



**Figure 2-3 Invalid License File**

**Note:** Contact Lighthouse Worldwide Solutions, and provide the machine ID on which LMS Express will be installed to receive a valid license file. The License can be tied to either a machine ID, HASP ID or both.

Place a valid license file at the default location C:\Program Files\Lighthouse Worldwide Solutions\Licenses\ (This path is for 32 bit operating systems only) and click Refresh on the License Error window or restart LMS Express.

If the problem persists, please contact Lighthouse Worldwide Solutions for further assistance.

## Setup Wizard

Once **Express** is installed and the first time LMS Express is launched, LMS Express Setup Wizard will begin:



Figure 2-4 LMS Express Setup Wizard

Click the Next button.

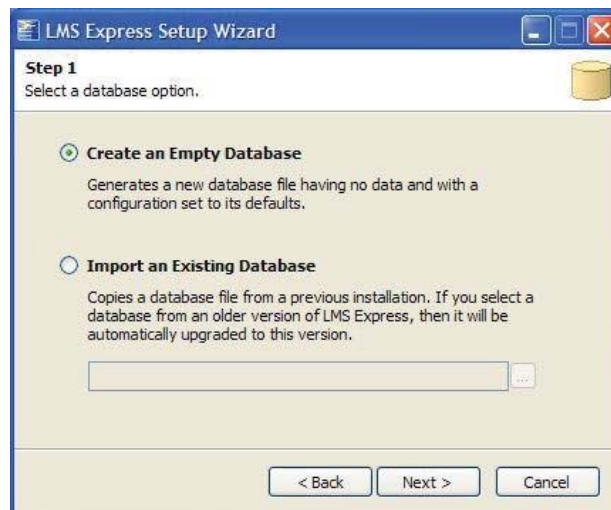


Figure 2-5 LMS Express Setup Wizard - Step 1

If this is a new installation of LMS Express, select Create an Empty Database and click Next.

If you are upgrading from a previous version of LMS Express and want to keep your previous data and configuration, select Import an Existing Database, use the “...” button to locate the previous “main.mdb” (LMS Express 7) or “main.db3” (LMS Express 8) LMS Express database file, and click Next.

**Note:** If you are upgrading from LMS Express 8 to latest version of express 8.x, and using the existing data base, then while launching Express, the wizard will be skipped and directly display the home screen.



Figure 2-6 LMS Express Setup Wizard - Step 2

If you want LMS Express to automatically start when Windows starts, check the Auto-startup check box. This is especially recommended if you are collecting data real-time.

Click Next. The LMS Express Setup Wizard will display its closing window. Clicking Finish will launch LMS Express.

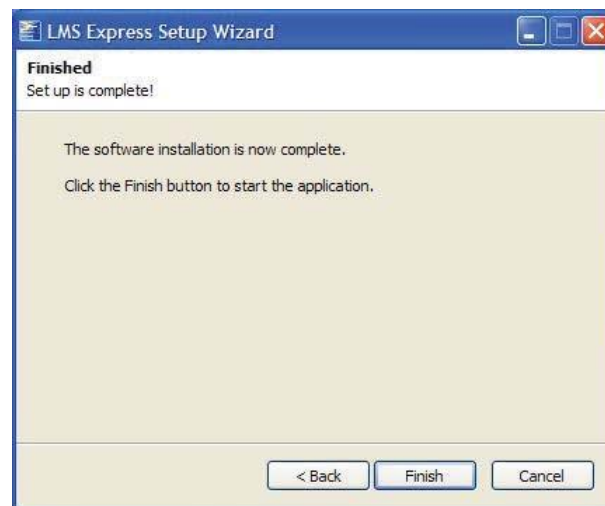


Figure 2-7 LMS Express Setup Wizard – Finish

## Login

---

Once the correct HASP or Soft License has been detected and the database has been initialized or updated, **Express** will start.

Logins are disabled by default and **Express** starts and immediately displays the splash screen followed by the main application window.

Enabling logins and checking the “Force user to log in on application startup” property in the Setup User Logins window, causes the program to display one of the following Login screens when the application starts.



Figure 2-8 Login Window(s)

## Splash Screen

---

Upon starting or after logging into **Express**, the splash screen displays.



Figure 2-9 LMS Express Splash Screen



## Main Window

After the **Express** startup is complete, the Home screen is displayed.

**Note:** Real-Time Data Status and Alarm Logging and Maps are only available only with LMS Express RT

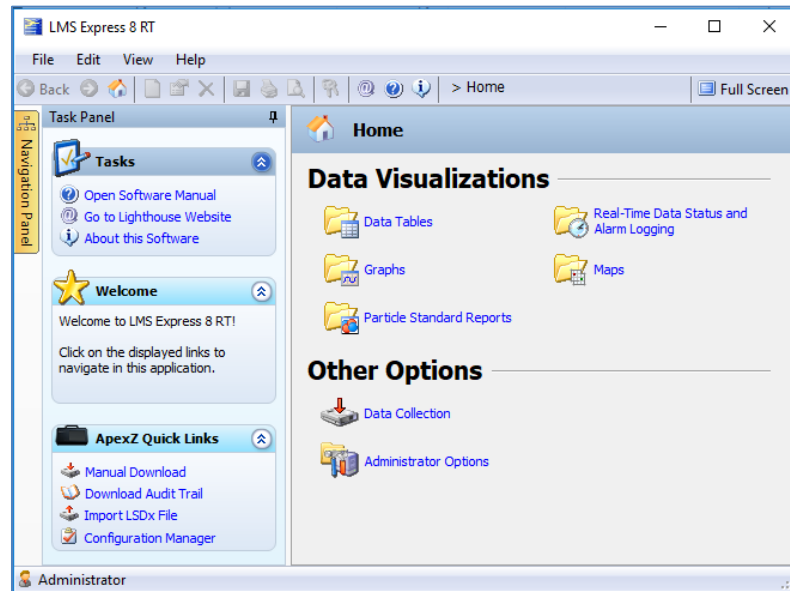


Figure 2-10 Main Window

## Basic User Interface

The **Express** user interface was designed to be easy to use. It is split into two basic parts: Data View area (status bar and view area.) and Navigation Tools (Menu, Toolbar, Task Panel and Navigation Panel).

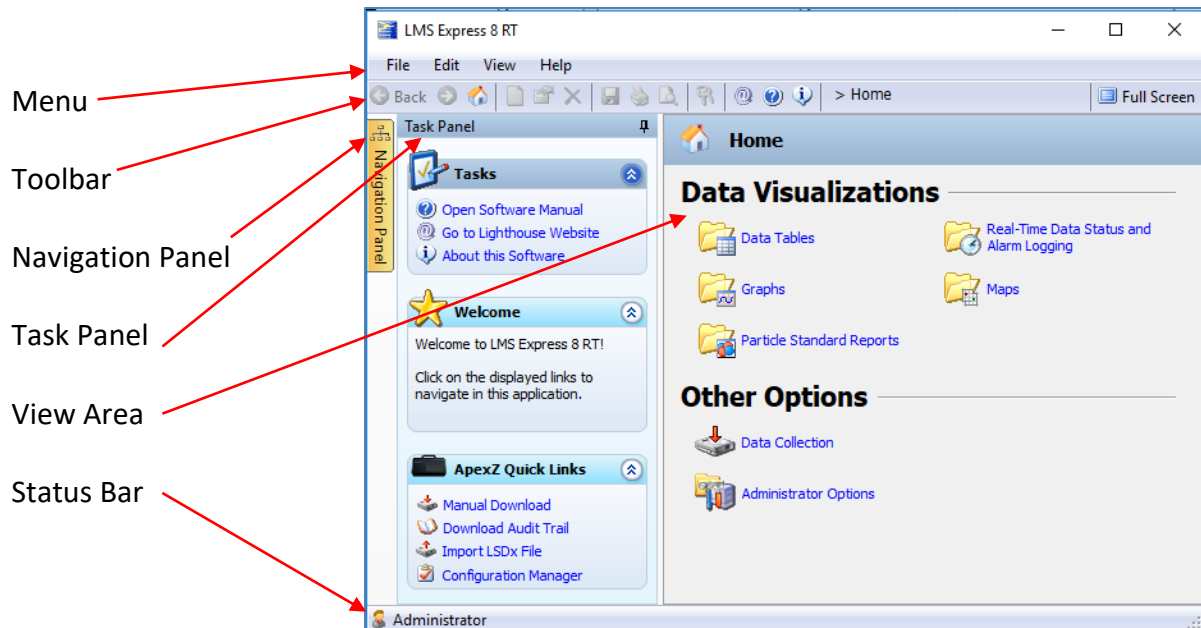


Figure 2-11 User Interface

## View

The View Area displays graphs, data tables, reports, logs or the active configuration information. **Express** allows the user to save multiple graphs, data tables and standard reports but only one view can be displayed at a time, i.e. one graph, data table or standard report.

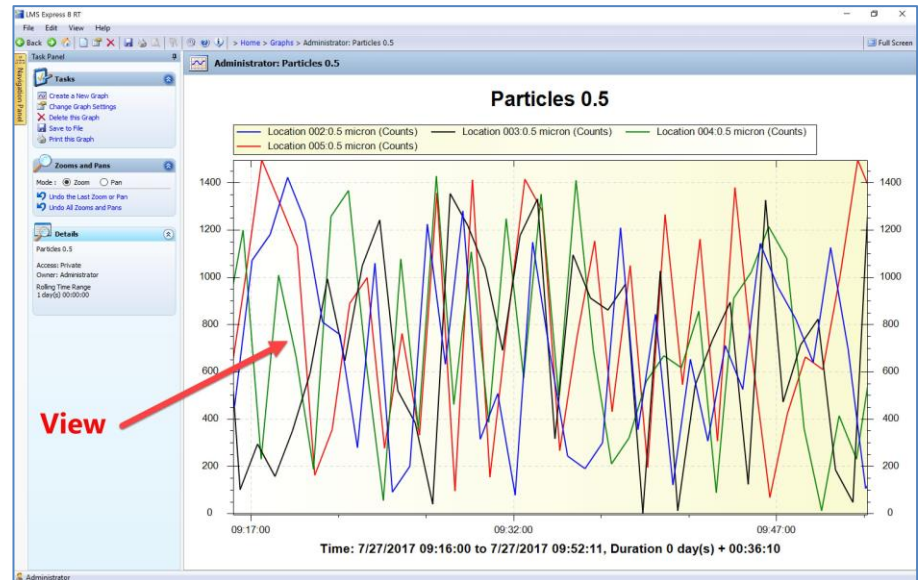


Figure 2-12 Example Graph View Area

## Status Bar

The Status bar at the bottom of the **Express** Main window displays the logged-in user's full name.

If LMS Express RT is installed and alarms are enabled, the current overall status will appear on the right side of the status bar. See "Status and Alarms" for more details.

If the user has loaded an archive database, the right side of the status bar will say "Archive".

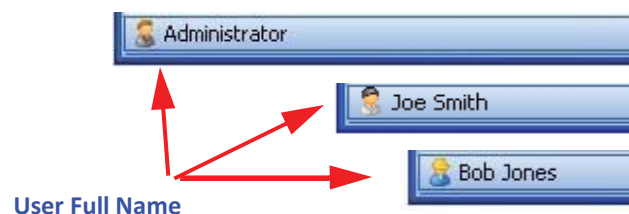


Figure 2-13 Express Status bar

## Navigation

### Toolbar

The Toolbar buttons navigate between views, implement actions on the current view and open a web browser link to our corporate website [www.golighthouse.com](http://www.golighthouse.com). Not all buttons apply to all views and some are disabled for views that do not use them.



Figure 2-14 Express Tool bar

The first three buttons, Back, Forward and Home, provide a simple way to navigate through **Express**.



Figure 2-15 Browser Navigation - Back, Forward and Home

**Note:** Use the Back, Forward and Home buttons to quickly navigate through Express

Click the Back button to re-display previous views, including previously viewed graphs, data tables, standard reports and menus.

Click the Forward button to advance to the next view.

Click the Home button to return to the Home view and display the Main menu in the View Area.

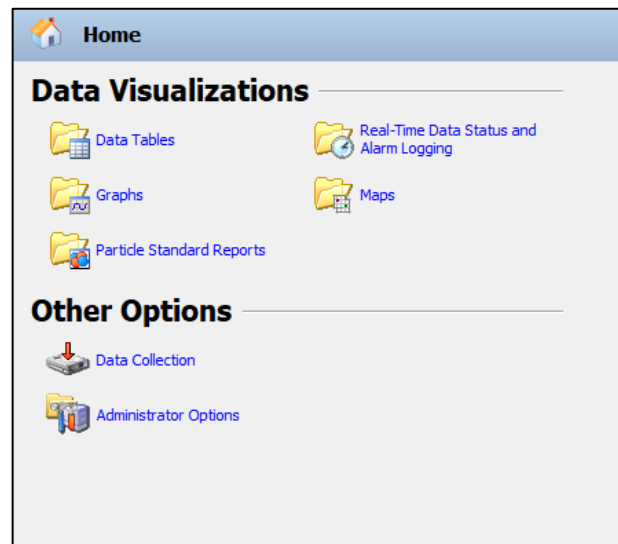


Figure 2-16 Home View, Main Menu Displayed in View Area

Click a menu item on the Home view area to go to that item.  
The Home Main menu contains the following options:

**Data Table:** Display a data table.

**Graph:** Display a graph.

**Particle Standard Report:** Display a standard report (Fed Std 209E, ISO 14644-1:1999, ISO 14644-1:2015, EU GMP Annex 1, or BS-5295).

**Real-Time Data Status and Alarm Logging:** Display real time location, instrument and data set status. Only available for LMS Express RT.

**Maps:** Display a map. (Only available in LMS Express RT).

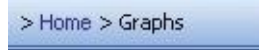
**Data Collection:** Manually download data from an instrument (both versions of **Express**). Setup real-time data collection from instrument(s) using LMS Express RT.

**Note:** You must be logged in as an Administrator to view or use the functions on the Administrator Options screen.

**Administrator Options:** Administrators can access system options for **Express**, including: unit conversion; naming and viewing instruments; editing location names and numbers; database maintenance and archiving; managing user accounts and logins; viewing the Event log; and setting up alarms and warnings.

## Browser Path

The browser path of the current view is displayed on the right side of the toolbar at all times.











> Home > Graphs






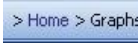

**Figure 2-17 Example of Browser Path**

Blue items in this path are links. Clicking on one of these links will display the associated view.

## Toolbar Buttons

The following table describes the commands available on the toolbar.

Button	Command	Description
	Back	Click this button to re-display the most recently display view.
	Forward	Click this button to display the next previously displayed view. If the current view is the most current view, this button will be disabled.
	Home	Click Home to display the Home view, i.e. the home menu in the view area.
	New	Add a new item such as a new graph, data table, standard report, user account or log entry. This button is disabled in some views.
	Setup	Open a configuration dialog for the current view. For example, display the Graph's information if a graph is currently viewed. The dialog window will be different for different views.
	Delete	This button is disabled in some views. Delete the current item. For instance delete the current user or graph. This button is disabled in some views.
	Save As	Opens Save As dialog box and saves the current view's information to a file. The file format depends on the view being saved. This button is disabled in some views.
	Print	Open a Print Setup dialog box and print the current view. This button is disabled in some views.

Button	Command	Description
	Print Preview	Use Print Preview for viewing Locations, Data tables, Alarms & Warning Log, Particle Standard Reports, and Event Log on screen before printing.
	Login/Logout	Only enabled if logins have been enabled by an administrator.
	Open	Opens a web browser to display the Lighthouse website <a href="http://www.golighthouse.com">www.golighthouse.com</a> .
	Operators Manual	Display the Operators Manual (Adobe Acrobat Reader must be installed to view this file).
	About	Open the About dialog window to display the version number, copyright information and license agreement.
	Browser Path	Displays the current browser path at all times.
	Full Screen	Displays Full Screen, instead of a 'windowed' display.

**Table 2-18 Table of Toolbar Buttons**

## Menu

**Note:** Use the Home menu and/or toolbar buttons to access graph, data table, standard reports, data collection and administrator options.

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

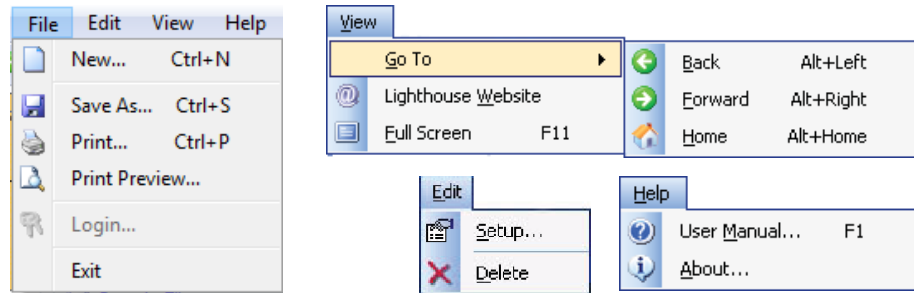


Figure 2-19 Drop Down Menus

## About Window

Clicking the About toolbar button displays the following **Express** About window.

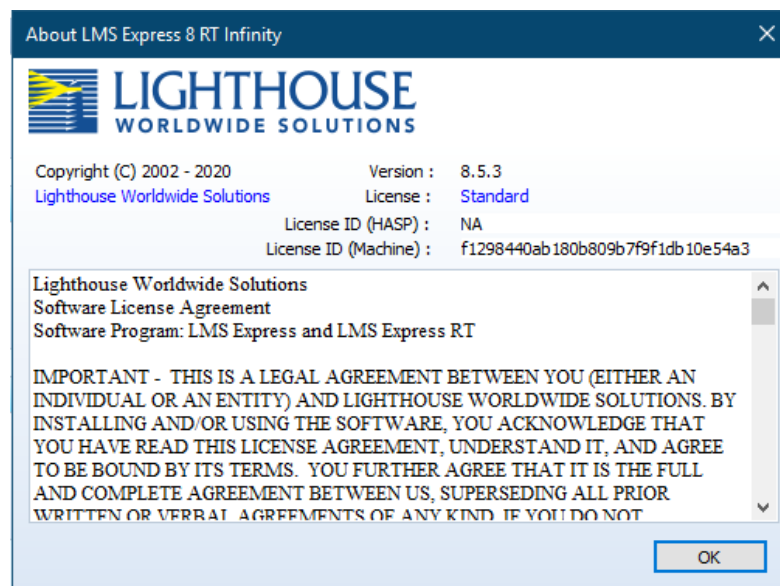


Figure 2-20 About Window

Clicking on the blue “Lighthouse Worldwide Solutions” text below the Copyright date will open a browser window to the Lighthouse Worldwide Solutions website home page.



Figure 2-21 Lighthouse Worldwide Solutions - Home Page

Clicking on the text next to “License:” will display the License information window for the LMS Express installation.

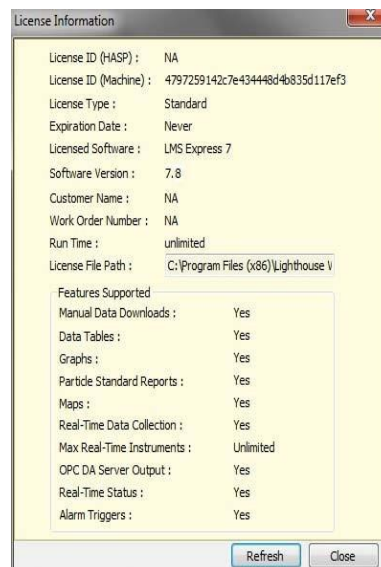


Figure 2-22 License Information Window



**Note:** *The Task Panel can be minimized to expand the View area.*

## Task Panel

The Task Panel provides options for the current view and is located on the left side of the Express window.

Typical options on the Task Panel include New, Setup and Delete, but options vary by the view chosen. For example, the Task Panel options for graphs will be different than the options available on the real-time data collection task panel.

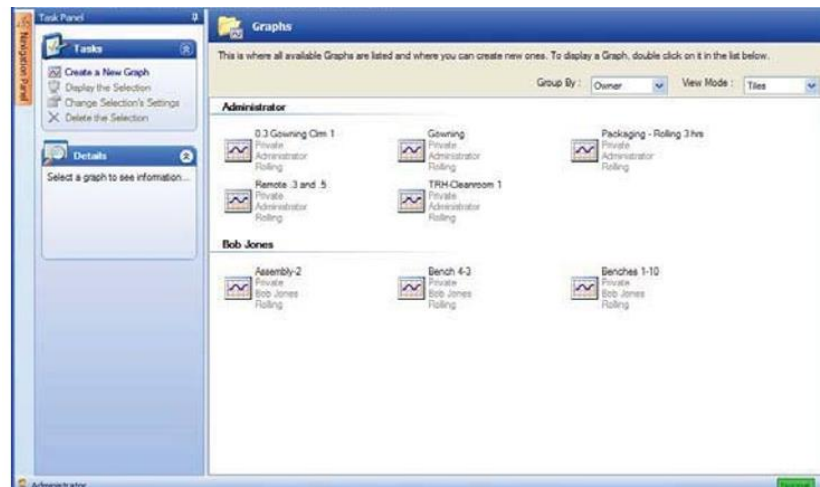


Figure 2-23 Task Panel, Graph Tasks

## Navigation Panel

**Note:** *Beginning users may want to use the Home, Back and Forward buttons for navigation until they feel comfortable with Express' Advanced options.*

The Navigation Panel gives advanced users a quick way to move between **Express** views and options.

The Navigation Panel is located on the far left side of the **Express** window.

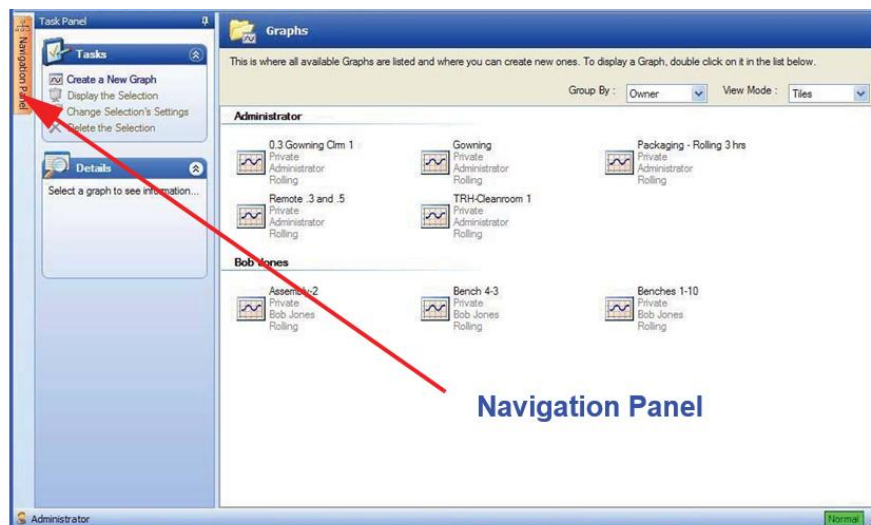
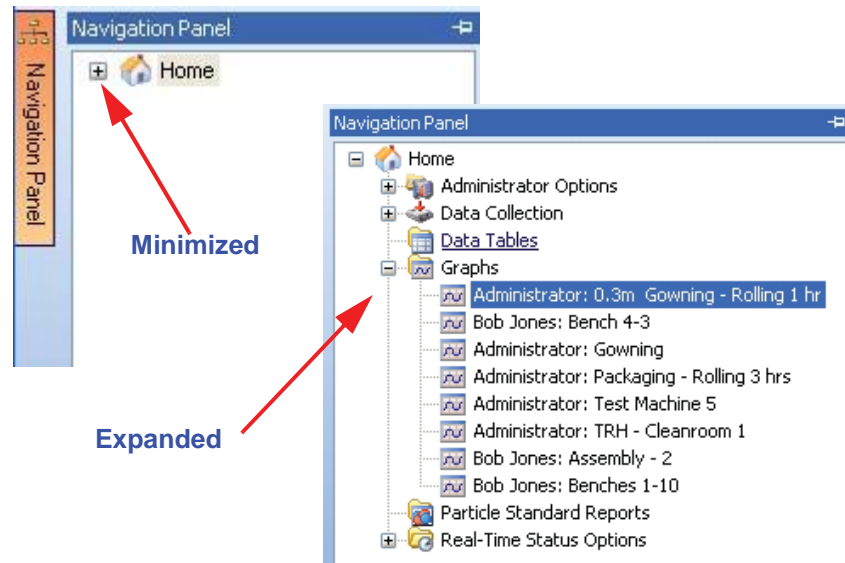


Figure 2-24 Navigation Panel - Minimized

Clicking on the Navigation Panel will display the Navigation list. The Navigation Panel window initially contains only the root option, Home. Clicking on Home expands the Navigation Panel.



**Figure 2-25 Navigation Panel - Initial and Expanded Examples**

As you open new options, the Navigation Panel will reflect which options have been accessed by expanding them in its menu tree.

## Shutdown

---

### Express Shutdown

If logins are not enabled, you may shut down **Express** in any one of three ways:

- Click **Alt+F4**;
- click on the “x” in the program’s upper right corner;
- click on the system menu (the icon in upper left corner of the window) and select Exit.

If logins have been enabled, the current user must be at least a Power User in order to shut down **Express**. If the current user is not a Power User or an Administrator, the user must log off and a Power User or Administrator log in. After a successful change of users, you may use any of the above choices to shut the program down.

### Express RT Shutdown

If logins are not enabled, you may shut down **Express RT** in one of three ways:

- Click **Alt+F4**;
- click on the “x” in the program’s upper right corner;
- click on the system menu (the icon in upper left corner of the window) and select Exit.

If logins have been enabled, the current user must be at least a Power User to shut down **Express RT**. If the current user is not a Power User or an Administrator, the user must log off and a Power User or Administrator log on. After a successful change of users, you may use any of the above choices to shut the program down.

### Express RT Shutdown (real time data active)

If real time data retrieval is active when shutdown is requested and Prompt User on Exit is enabled in the Application Properties window, the program (**Express RT**, only) will prompt the user to confirm the shutdown action, shown in Figure 2-25.



**Figure 2-26 RT Shutdown Warning Dialog Box**

If the request comes through an automatic shutdown/restart as in during Windows Automatic Update process or if Prompt User on Exit is disabled in the Application Properties window, it will close the program and allow automatic restarting of the system.

## Chapter 3      Graphs

This chapter describes how to create and display graphs in **Express**.

### Graphs

**Express** users can create and display static graphs. **LMS Express RT** users can additionally create and display rolling graphs.

Graphs can be viewed by either everyone (Public) or only by owner and administrator. Each graph can display data for up to 10 data sets at a time and have up to 5 control lines enabled..

To display or create a graph, first display the Graph view by clicking the Home button and then the Graphs option from the Home menu.

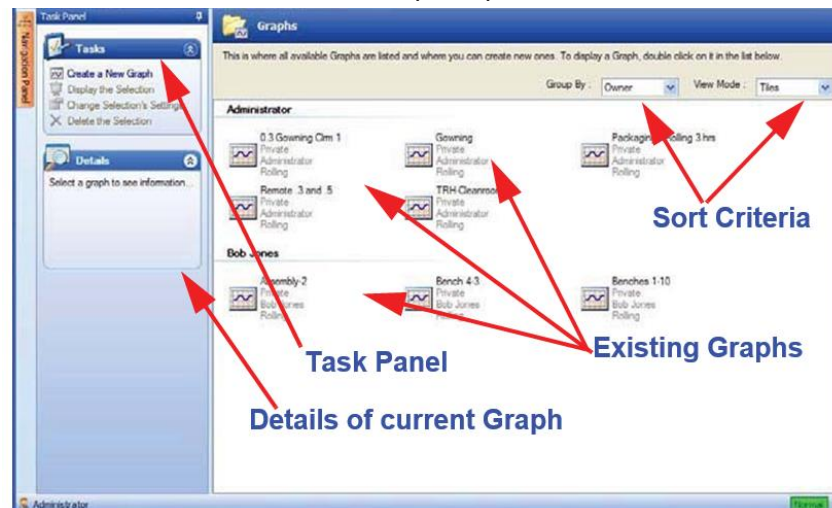


Figure 3-1 Graph View

### Sort Criteria

Existing graphs can be sorted by several types of group criteria (<None>, Access, Owner, or Time Range) and displayed as icons, tiles, or detailed records.

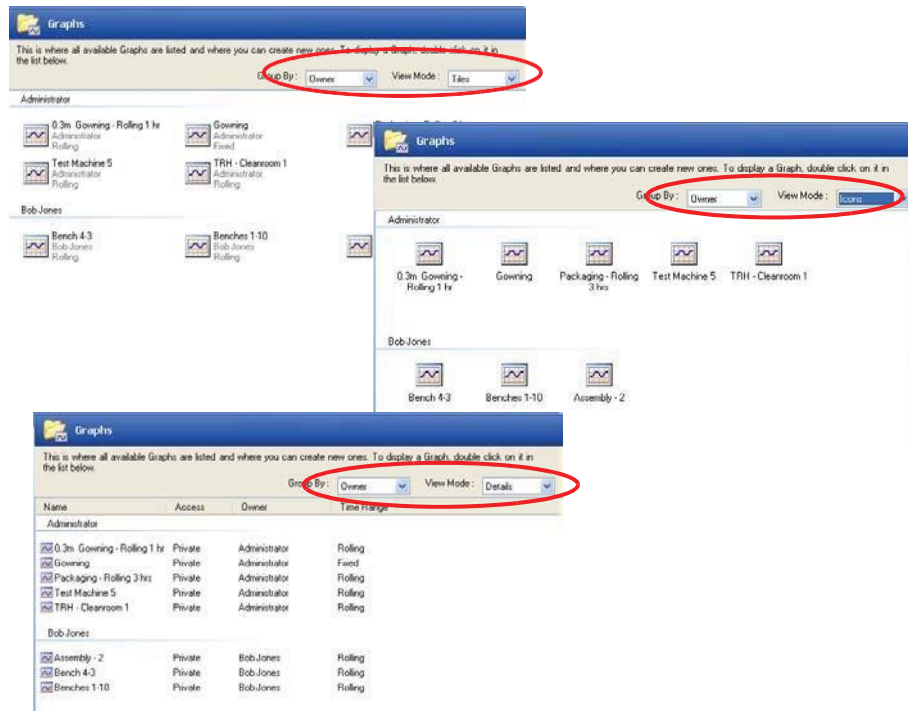
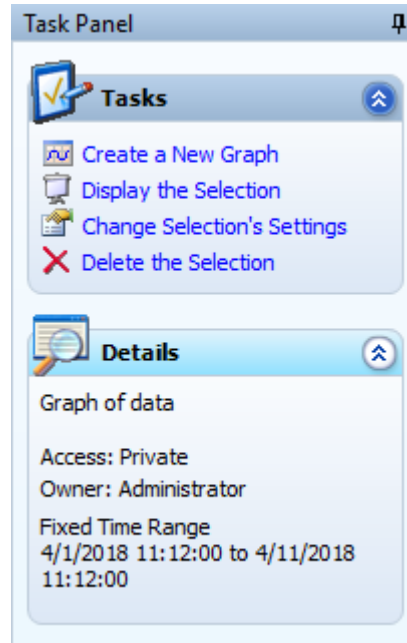


Figure 3-2 Sort By Criteria and Results

## Task Panel

When a graph, or list of graphs, is displayed in the View, the Graph's Task Panel appears on the left side of the active window.



**Figure 3-3 Graph Task Panel**

The Graph Task Panel contains two sections: Tasks and Details.






Under the Tasks section users can:

- Create a New Graph
- Display the Selection
- Change Selection's Settings
- Delete the Selection

Under the Details section, users see details about the currently selected Graph, including its name, who can access it, who owns it and its type (fixed time range or rolling) and data range.

### Tool Bar Buttons

When the Graph view is displayed the following toolbar buttons are enabled:

Button	Function
	<b>New:</b> Create a new graph.
	<b>Setup:</b> Opens the Setup Graph dialog.
	<b>Delete:</b> Delete the current graph.
	<b>Save As:</b> Opens a Save As dialog window and allows the user to export the currently displayed graph to a bitmap (*.bmp), GIF (*.gif), Jpeg (*.jpg, *.jpeg), PNG (*.png) or Tiff (*.tif, *.tiff) file.
	<b>Print:</b> Opens the Printer Setup dialog and allows the user to print the currently displayed graph.

**Table 3-4 Graph Toolbar Buttons**



## Displaying a New Graph

To create a graph, follow these steps:

1. Click on “Create a New Graph” on the Graph Task Panel. The Graph Setup window appears.

**Note:** Only Administrators can change who owns or can view a graph

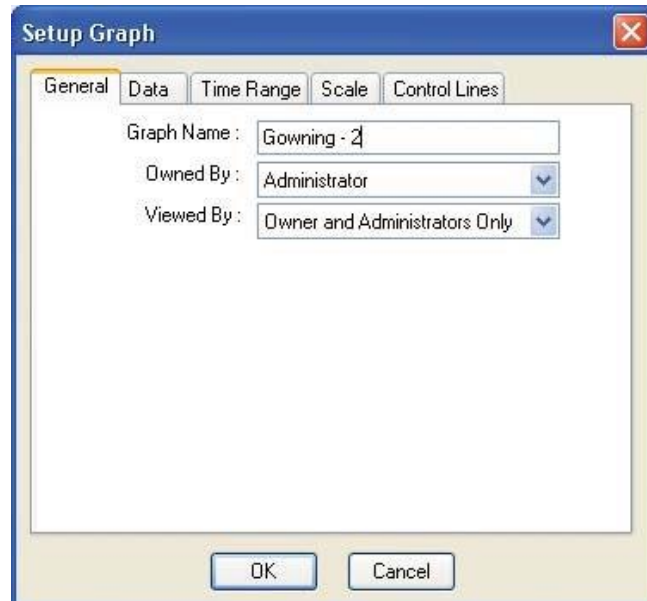


Figure 3-5 Graph Setup - General Information

2. Enter a name for the graph.
3. Administrators can change or choose the owner of the graph by selecting a user name from the Owned By list. If the user is not an administrator, this field is grayed out.
4. Administrators can select which users can see the graph - either just the owner and administrators, or everyone. If the user is not an administrator, this field is grayed out.

**Note:** By default, users see only graphs of their own or that were made public. Administrators can see all graphs.

- Click on the Data tab. The following information displays.

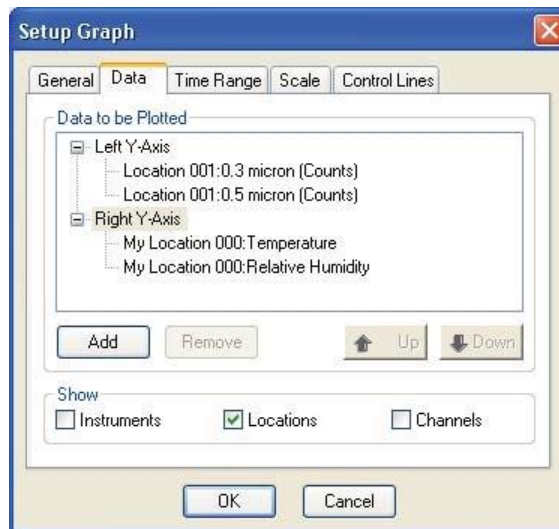


Figure 3-6 Graph Setup - Data Set Information

- Data can be plotted on either the left or right axis. Click on either the Left Y-Axis or Right Y-Axis items in the “Data to be Plotted” list to select an axis.
- Next, select at least one data set. Select data set(s) by clicking the Add button in the “Data to be Plotted” section of the Setup Graph window (Figure 3-6).

**Note:** The graph’s Y- Axis can be linear or logarithmic. The logarithmic Y-Axis minimum is 1. See the Graph Setup - Scale tab

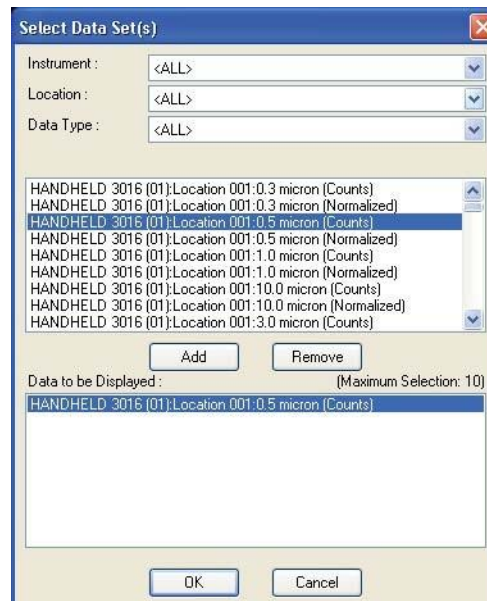


Figure 3-7 Select Data Set(s) window

**Note:** At least one data set must be selected before a graph can be displayed.

**Note:** You can select up to 10 Data Sets to be displayed on the graph.

8. By default, all data sets are shown in the list. To filter the list, select an Instrument, Location or Data Type from the appropriate pull down list box. The list of available data set names is updated according to the chosen criteria.

9. Add data set names to the list at the bottom of the window by highlighting a data set in the list and clicking the Add button.

10. When you have added all the data set names you wish to display to the "Data to be Displayed" list, click the OK button.

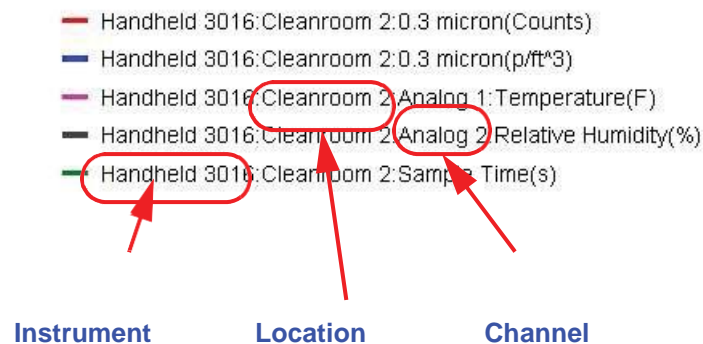
11. To change the order of the data sets in the Graph legend, select a data set name and click the up or down arrow buttons.

12. To remove a data set from the "Data to be Plotted" list, select it and click Remove.

13. In the Show section of the window, checking or unchecking Instrument, Location and/or Channel displays or hides, the respective part of Data Set Name(s) in the Graph Legend and in the Data to be Plotted list on the Graph Setup window.

**Note:** Channels are only shown for analog data.

For example, if Show Instrument, Location and Channel are all checked, the legend of the displayed graph appears (Figure 3-7).



**Figure 3-8 Graph Legend**

**Tip:** You can find the date range of all the data in the database by clicking on the Database icon in the Administration Options section.

**Note:** LMS Express users can only build fixed graphs. LMS Express RT users can build and display rolling or static Graphs.

14. Next, click the Time Range tab, as shown in Figure 3-8.

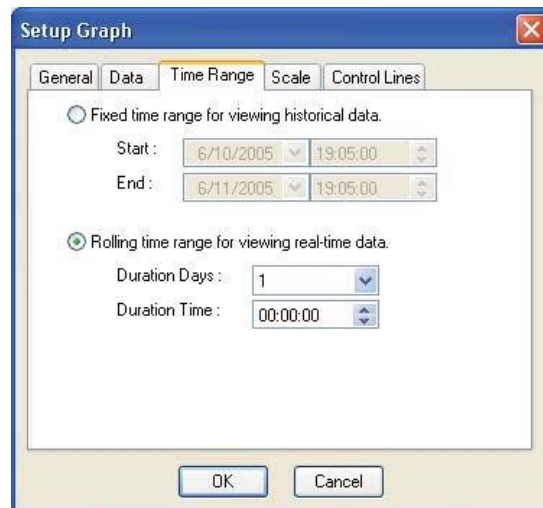


Figure 3-9 Graph Setup - Time Range Information

15. In the Time Range section of the Setup Graph window, select the type of graph.

### Rolling Graph

LMS Express RT users can display a rolling graph. If Rolling is selected, enter a duration of data to be displayed. Users can enter a number of days, hours, or a combination of both for the duration. Data for the last hours or number of days entered is displayed. The displayed data updates continuously, given the sample and hold times.

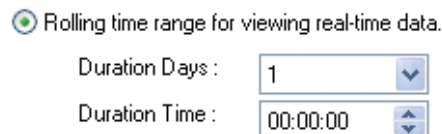


Figure 3-10 Time Range fields for a Rolling Graph

## Fixed Graph

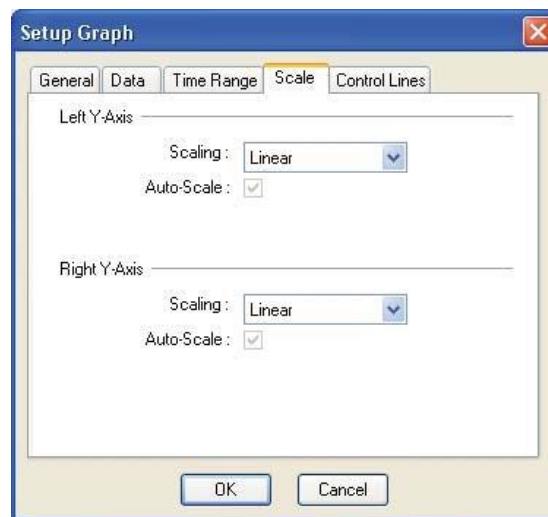
If you select fixed for the time range, enter the start and end date and time for which you wish to display data. Only data in this date and time range is displayed.

 Fixed time range for viewing historical data.

Start :	6/10/2005	12:15:00
End :	6/10/2005	16:00:00

**Figure 3-11 Time Range fields for a Fixed Graph**

16. Next, click the Scale tab. The following information displays.



The image shows a 'Setup Graph' dialog box with the 'Scale' tab selected. The dialog has five tabs: General, Data, Time Range, Scale, and Control Lines. The 'Scale' tab contains settings for the Left Y-Axis and Right Y-Axis. For each axis, there is a 'Scaling' dropdown menu set to 'Linear' and an 'Auto-Scale' checkbox that is checked. At the bottom of the dialog are 'OK' and 'Cancel' buttons.

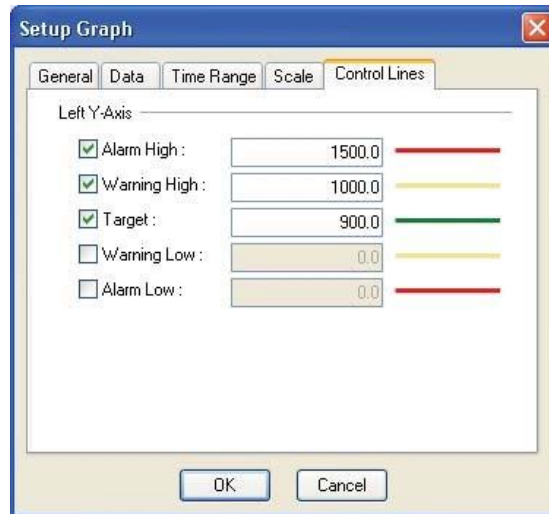
**Figure 3-12 Graph Setup - Scale Information**

17. The graph can be scaled linear or logarithmic on both the left and right Y-Axis. Select linear or logarithmic from the pull down lists for each axis.

18. Click next on the Control Lines tab. The following information displays.

**Note:** The names of enabled graph control lines appear on the graph's legend.

**Note:** Enabled Control Lines always display on the graph. They are not auto-scaled off the graph

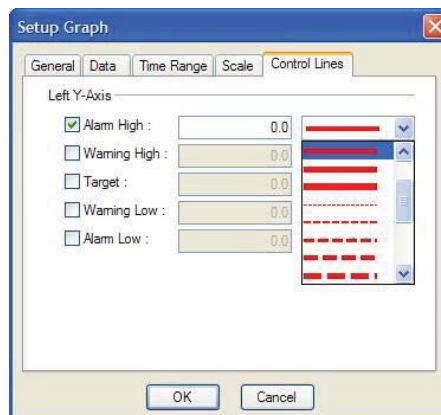


**Figure 3-13 Graph Setup - Control Line Information**

19. Five control lines are available: Alarm High, Warning High, Target, Warning Low and Alarm Low. To enable a control line, check the box next to the line you want to display and then enter a value for the line. Disable a control line by un-checking it.

Select 1 or more control lines to display on the graph.

Click on the pulldown field to choose the style and width for the control line.

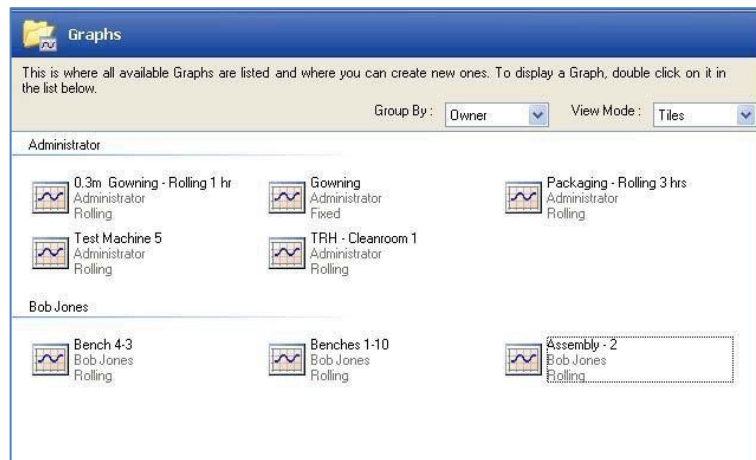


**Figure 3-14 Graph Setup - Selecting Control Line Style and Width**

20. Click OK to build the graph. The graph view area updates to display data for the instruments, date and time, that you selected.

## Displaying Existing Graphs

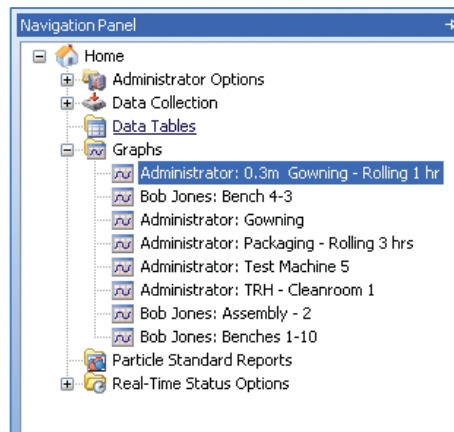
If you have created one or more graphs, the names of the graphs are displayed in the graph view. Users can create unlimited graphs.



**Figure 3-15 Graph View -List of Graphs (Administrator)**

**Note:** Administrators can see all graphs users and administrators have created. By default users can see only their own graphs unless an Administrator changes it to be viewable by "Everyone (Public)"

Use the Group By and View Mode lists to sort and display the graphs in different ways. A list of all graphs the user can access is also available under Graphs in the Navigation Panel.



**Figure 3-16 Navigation Panel - Graphs (Administrator User)**

**Note:** Everyone can view a graph that is set to "Everyone (Public)". Only Administrators can view graphs that are set to "Owner and Administrators Only".

In the Navigation Panel, graph names are prefaced by the user name.

For example,

BJones: Gowning - Assembly 2  
Administrator: Gowning

To display another, existing graph, click on it in the Navigation Panel, or double click on it on the Graph view.

## Graph Display Features

When a graph is displayed the following features are available for the user.

### Data Point Pop up (Mouse Over)

Moving the mouse over a data point and pausing displays the data point's date, time and value.

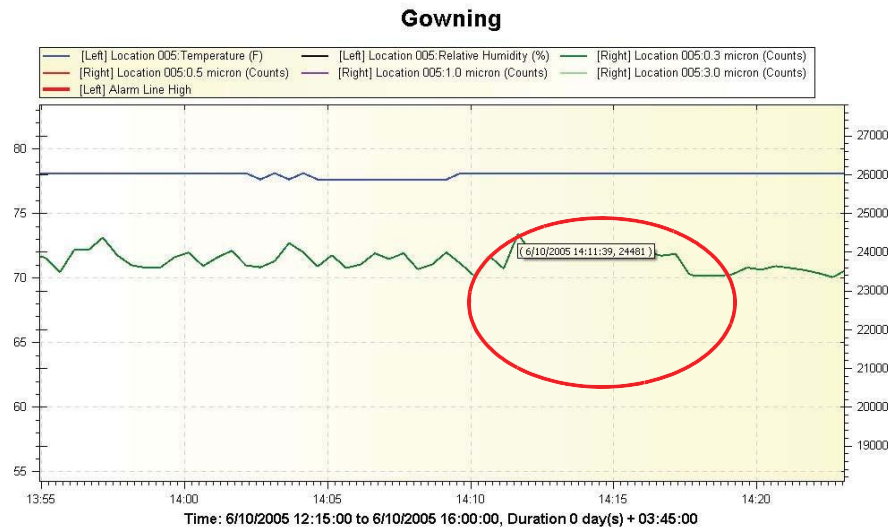


Figure 3-17 Graph - Data Point Tool Tip

### Zoom

To zoom data on a graph, first select Zoom Mode from the Task Panel.

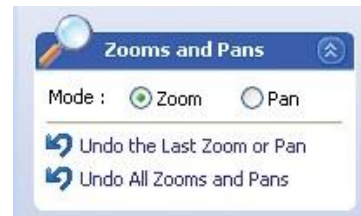


Figure 3-18 Graph - Zoom mode selected

Then, select an area on the graph to zoom by clicking and holding down the left mouse and dragging it. This highlights and selects an area of the graph.

The graph rebuilds to display just the selected area once the user releases the left mouse button.



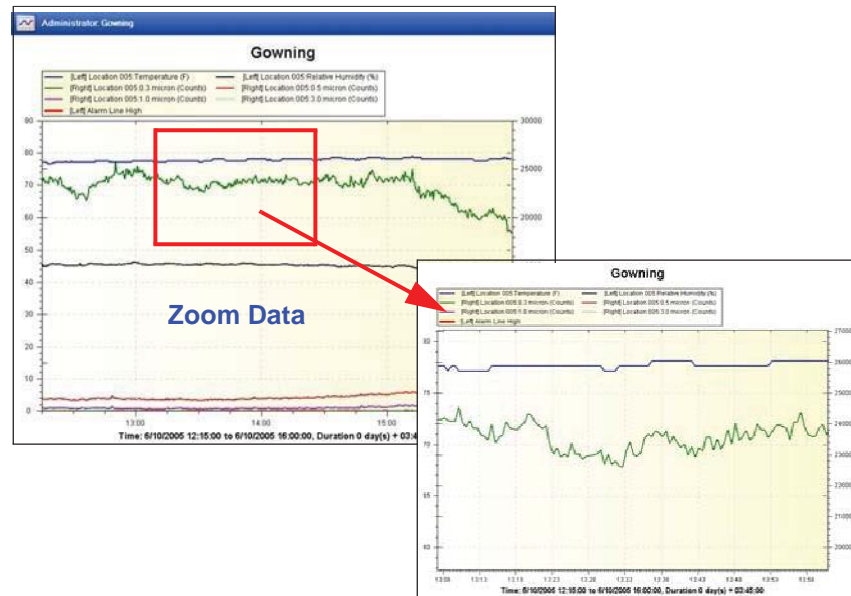


Figure 3-19 Zooming Graph Data

To undo the current zoom, select "Undo the Last Zoom or Pan" from the Task Panel.

To return to the original view of the graph, click "Undo All Zooms and Pans" on the Task Panel.

## Pan

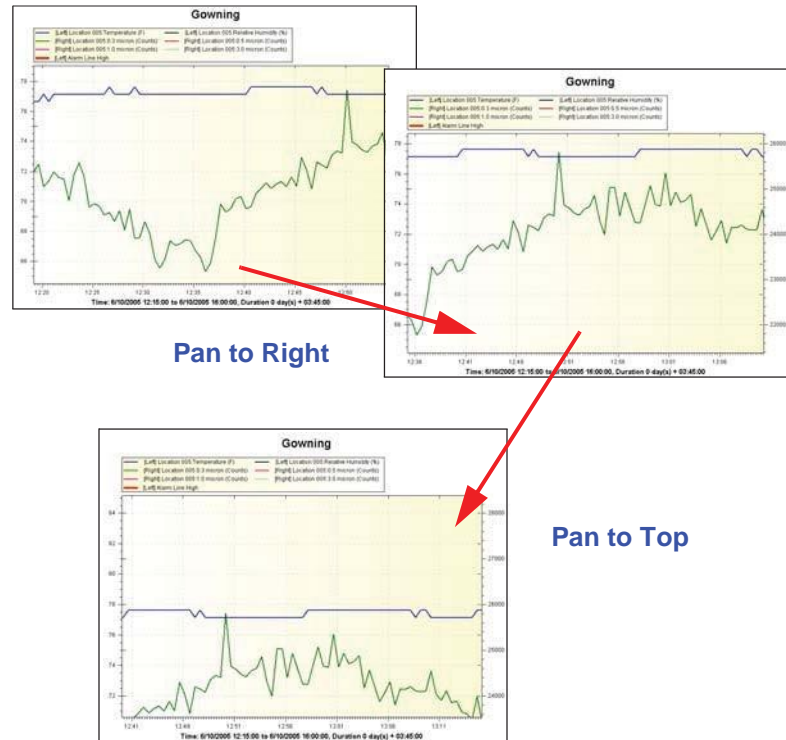
The pan feature allows moving the data displayed in the window left, right, up or down. Select Pan on the Graph Task Panel.

**Note:** Use the zoom and pan features together to zoom into an area, such as a particular data set, then pan the data, which, in effect, scrolls through that data.



Figure 3-20 Graph - Pan Mode Selected

Move (hover) the cursor over the Graph View area, which changes it to a large 4-point cross. Choose a spot on the graph, click and hold the left mouse button and move the mouse. This action moves the graph within the graph display area.



**Figure 3-21 Graph - Pan Example**

To undo the current pan, select "Undo the Last Zoom or Pan" from the Task Panel.

To return to the original view of the graph, click "Undo All Zooms and Pans" on the Task Panel.

### Details

The Details section on the Graph Task Panel displays information about the currently selected or displayed graph, including name, access, owner, type (fixed or rolling time range) and date range.



**Figure 3-22 Graph – Details**



## Printing

---

### Printing Graph

When the Graph is viewed you can print it by clicking on the Print button on the toolbar.

1. Display the Graph.
2. Click the Print button.
3. On the default print window that appears, select a printer and click OK

## Exporting Data

---

Data can be exported to several different file types.



### Export Graph

To save the graph as a Bitmap, Gif, Jpeg, PNG, or Tiff file, follow these steps:

1. Display a graph.
2. Click on the Save As button.
3. On the Save As window that appears, select the file type to save to: Bitmap (\*.bmp), Gif (\*.gif), JPEG (\*.jpg, \*.jpeg), PNG (\*.png), or Tiff (\*.tif, \*.tiff).
4. Use the navigation tools at the top of the dialog box to select the directory into which to save the file.
5. Enter a name in the “File Name” field.
6. Click Save.

Blank Page

# Chapter 4 Data Tables

This chapter describes how to create and display data tables in **Express**.

## Data Tables



Data tables allow you to view data in a tabular, Excel like format and can be used for historical data review. Summary information, such as average, minimum and maximum values help you analyze data.

**Express** users can create and display static Data Tables. LMS Express RT users can additionally create and display rolling Data Tables.

Data Tables can be viewed by either everyone (Public) or only by owner and administrator. Each Data Table can display data for up to 16 data sets at a time.

To display or create a Data Table, first display the Data Table view by clicking the Home button and then the Data Tables option from the Home menu.

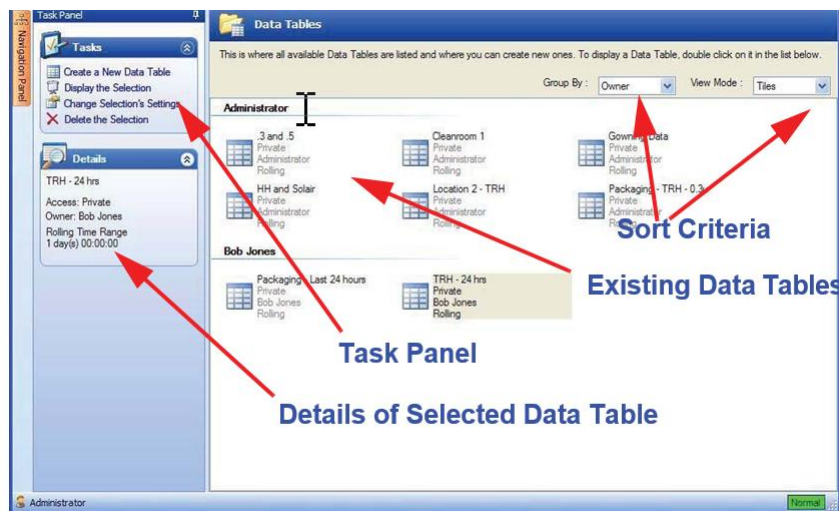


Figure 4-1 Data Table View

## Sort Criteria

Existing Data Tables can be sorted by several types of group criteria (<None>, Access, Owner, or Time Range) and displayed as icons, tiles, or detailed records.

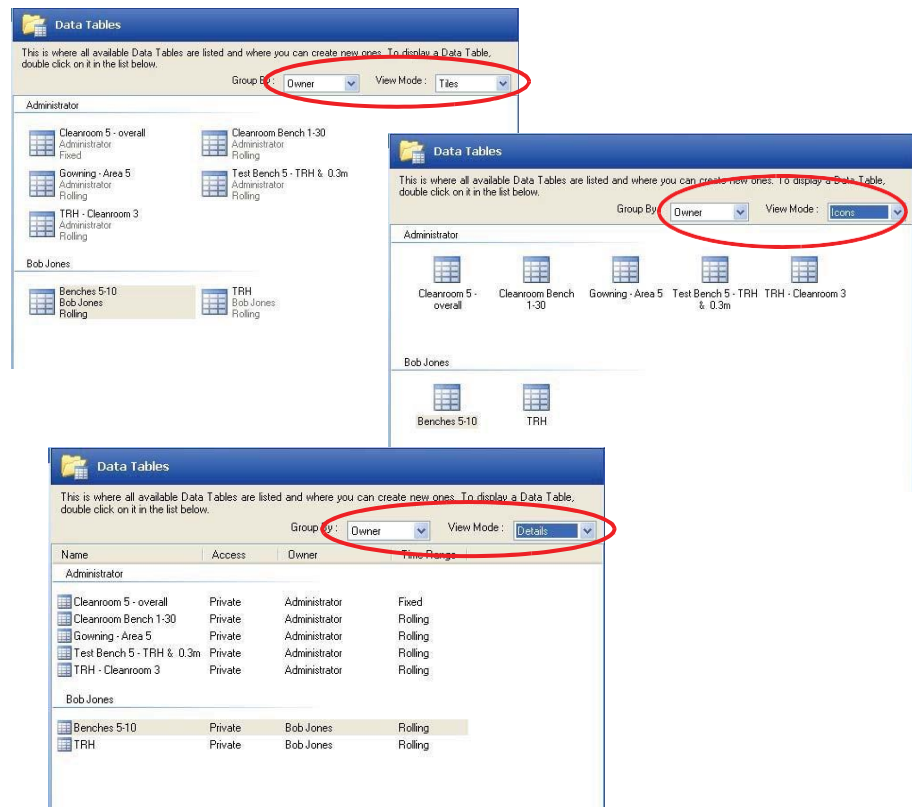
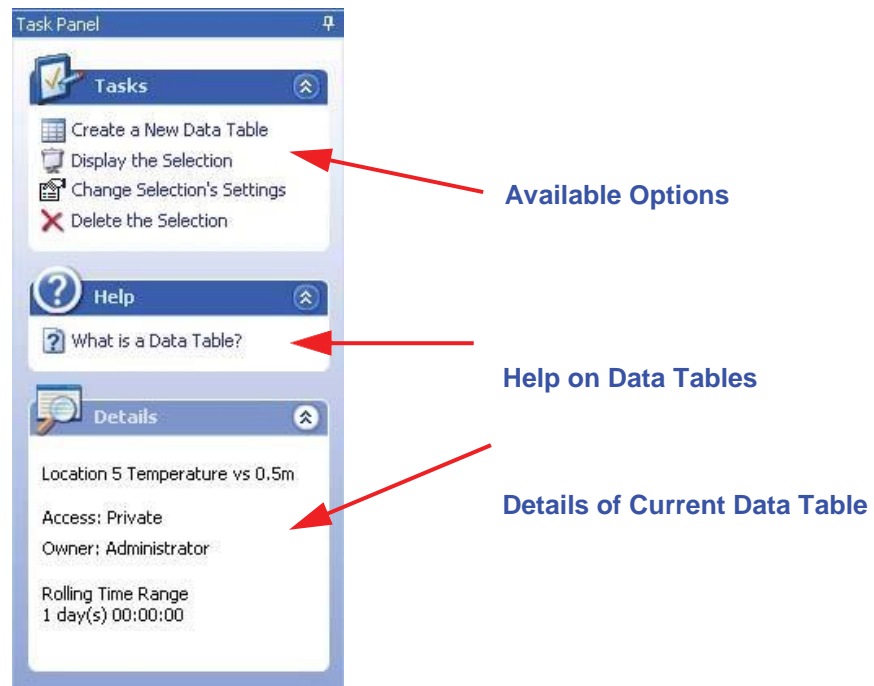


Figure 4-2 Sort By Criteria and Results

## Task Panel

When a Data Table, or list of Data Tables, is displayed in the View, the Data Table's Task Panel appears on the left side of the **Express** window.



**Figure 4-3 Task Panel**

The Data Table Task Panel contains three sections: Tasks, Help and Details.

Under the Tasks section users can:







- Create a new Data Table
- Display an existing Data Table
- Change the selected Data Table's settings
- Delete the Data Table.

Under the Help section, users can click to get help on Data Tables.

Under the Details section, users see details about the currently selected Data Table, including its name, who can access it, who owns it, and time range (fixed time range or rolling).

### Tool Bar Buttons

When the Data Table view is displayed the following toolbar buttons are enabled:

Button	Function
	<b>New:</b> Create a new Data Table.
	<b>Setup:</b> Opens the Setup Data Table dialog.
	<b>Delete:</b> Delete the current Data Table.
	<b>Save As:</b> Opens a Save As dialog window and allows the user to export the currently displayed Data Table to an Excel (*.xls) or CSV (*.csv) file.
	<b>Print Preview:</b> Opens a Print Preview dialog window and allows the user to setup page dimensions and print.
	<b>Print:</b> Opens the Printer Setup dialog and allows the user to print the currently displayed Data Table.

**Table 4-4 Data Table Toolbar Buttons**



## Creating a New Data Table

**Note:** Only Administrators can change whoowns or can view a Data Table.

To create a Data Table, follow these steps:

1. Click on “Create a New Data Table” on the Data Table Task Panel. The Data Table Setup window appears.

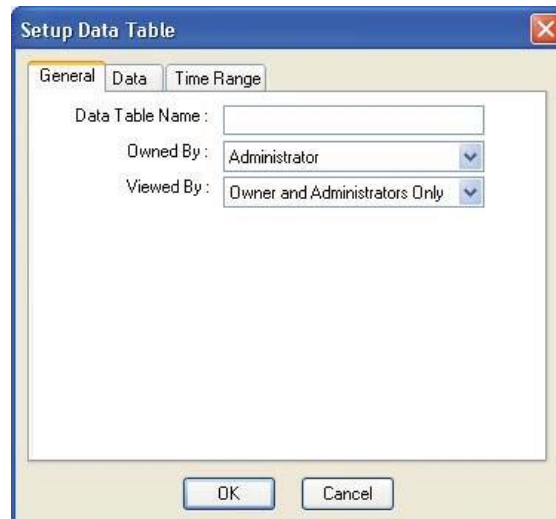


Figure 4-5 Setup Data Table General Tab

**Note:** By default, users only see data tables they own or data tables made public. Administrators can see all Data Tables.

2. Enter a name for the Data Table.
3. If the user is logged in as an administrator, the user can change or choose the owner of the Data Table by selecting a user name from the Owned By list. If the user is not an administrator, this field is grayed out.
4. If the user is an administrator, the user can select which users can see the Data Table - either just the owner and administrators, or everyone. If the user is not an administrator, this field is grayed out.

- Click on the Data tab.

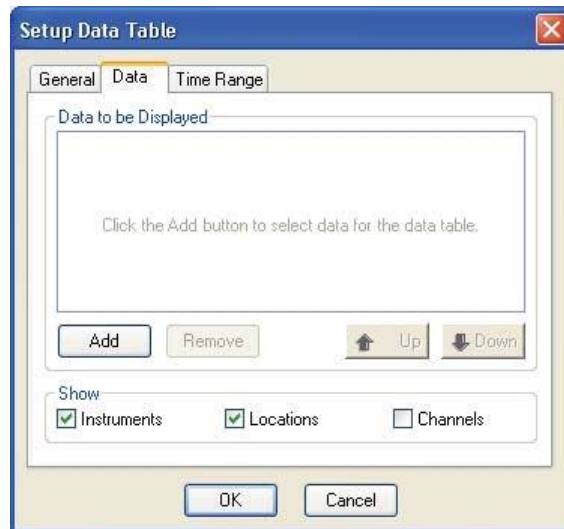


Figure 4-6 Data Tab

- Select at least one data set by clicking the Add button in the “Data to be Displayed” section of the Setup Data Table window. The following Select Data Set(s) window appears

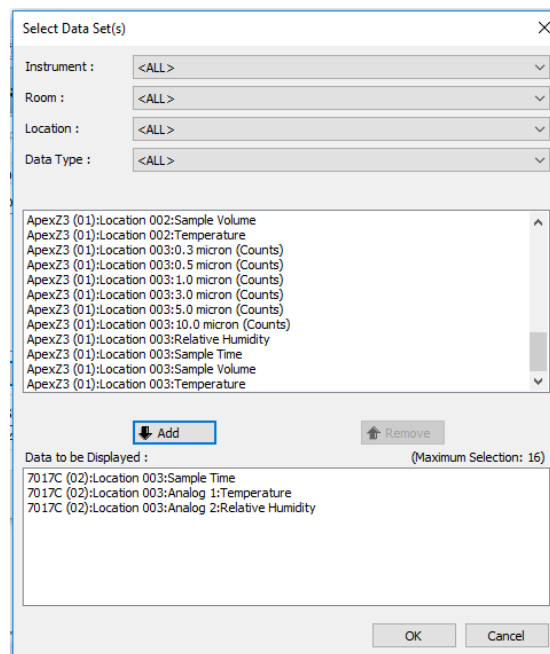


Figure 4-7 Select Data Set(s)

**Note:** At least one Data set must be selected before a Data Table can be displayed.

- By default, all data sets are shown in the list of data sets. To filter the list, select an Instrument, Room, Location or Data Type from the appropriate pull down list box. The list of available data set names is updated according to the chosen criteria.

**Note:** You can select up to 16 Data Sets to be displayed on the Data Table.

8. Add data set names to the list at the bottom of the window by highlighting a data set in the list and clicking the Add button or double clicking on the data set.
9. When you have added all the data set names you wish to display to the “Data to be Displayed” list, click the OK button.
10. To change the order of the data set columns, select a data set name and click the up or down arrow buttons.
11. To remove a data set from the Data to be Displayed list, select it and click Remove.
12. In the Show section of the window, checking or unchecking Instrument, Location and/or Channel displays or hides, the respective part of Data Set Name(s) in the Data Table header.

**Note:** Channel names are only shown for analog data.

For example, if you select Show Instrument, Show Location and Show Channel, the header of the Data Table appears as follows:

Instrument  
Location  
Channel  
Data Type  
Units

6/27/2005 10:38:00 to 6/28/2005 10:38:00					
	HANDHELD 3016 (01)	HANDHELD 3016 (01)	HANDHELD 3016 (01)	HANDHELD 3016 (01)	HANDHELD 3016 (01)
	Location 000	Location 000	Location 000	Location 000	Location 000
	0.3 micron	0.5 micron	Analog 1	Analog 2	
Time Stamp	(Counts)	(Counts)	Temperature (F)	Relative Humidity (%)	Sample Time (s)

**Figure 4-8 Data Table header, All Parts of Data Set Name(s)**

13. Next, click the Time Range tab. This dialog box appears:

**Tip:** You can find the date range of all the data in the database by clicking on the Database icon in the Administrator Options section.

The screenshot shows the 'Setup Data Table' dialog box with the 'Time Range' tab selected. It contains two radio button options: 'Fixed time range for viewing historical data.' and 'Rolling time range for viewing real-time data.' The 'Fixed' option is currently selected. Below it, 'Start' and 'End' date and time fields are shown with dropdown arrows. The 'Rolling' option is also visible with 'Duration Days' and 'Duration Time' fields.


**Figure 4-9 Data Table Setup - Time Range Information**

14. In the Time Range section of the Setup Data Table window, select fixed or rolling.

### Rolling Data Table

**Note:** *LMS Express users can only build fixed Data Tables. LMS Express RT users can create and display rolling and fixed Data Tables.*

Users can display a rolling Data Table only if they have LMS Express RT installed. After selecting Rolling, enter a duration to be displayed. Enter a number of days, hours, or a combination of both. Data is displayed for the last hours or days entered. The displayed data updates continuously.

 Rolling time range for viewing real-time data.

Duration Days :

Duration Time :

Figure 4-10 Time Range fields for a Rolling Data Table

### Fixed Data Table

If the user selects Fixed for the Time range, they must enter the start and end date and time. Only data in the entered date and time range is displayed when the Data Table is displayed.

 Fixed time range for viewing historical data.

Start :

End :

Figure 4-11 Time Range fields for a Fixed Data Table

15. Click OK to build the Data Table. The Data Table view area updates to display data for the instruments, date and time, that you selected.

7/11/2005 15:00:00 to 7/11/2005 15:50:00								
Time Stamp	Location 001 0.3 micron (Counts)	Location 001 0.5 micron (Counts)	Location 001 0.7 micron (Counts)	Location 001 1.0 micron (Counts)	Location 001 Temperature (F)	Location 001 Relative Humidity (%)	Location 001 Sample Time (s)	Location Sample Volume (ft <sup>3</sup> )
7/11/2005 15:39:05	0	0	0	0	81.0	47.3	30	
7/11/2005 15:39:35	0	0	0	0	81.0	47.3	30	
7/11/2005 15:40:05	0	0	0	0	81.0	47.5	30	
7/11/2005 15:40:35	0	0	0	0	81.0	47.6	30	
7/11/2005 15:41:05	0	0	0	0	81.0	47.5	30	
7/11/2005 15:41:35	0	0	0	0	81.0	47.5	30	
7/11/2005 15:42:05	0	0	0	0	81.0	47.5	30	
7/11/2005 15:42:35	0	0	0	0	81.0	47.3	30	
7/11/2005 15:43:05	0	0	0	0	81.0	47.2	30	
7/11/2005 15:43:35	1	0	0	0	81.5	47.2	30	
7/11/2005 15:44:05	0	0	0	0	81.0	47.2	30	
7/11/2005 15:44:35	0	0	0	0	81.0	47.3	30	
7/11/2005 15:45:05	0	0	0	0	81.0	47.3	30	
7/11/2005 15:45:35	0	0	0	0	81.0	47.5	30	
7/11/2005 15:46:05	0	0	0	0	81.0	47.3	30	
7/11/2005 15:46:35	0	0	0	0	81.0	47.6	30	
7/11/2005 15:47:05	0	0	0	0	80.5	47.5	30	
7/11/2005 15:47:35	0	0	0	0	80.5	47.6	30	
Average	0.1	0.0	0.0	0.0	81.1	47.6	30.0	
Maximum	1	0	0	0	81.5	48.3	30	
Minimum	0	0	0	0	80.5	47.0	30	
Standard Deviation	0.3	0.0	0.0	0.0	0.3	0.3	0.0	
Bad Flow Status	True	True	True	True	NA	NA	True	

**Figure 4-12 Sample Data Table**

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 will scroll.

The bottom of the Data Table will contain a section of summary statistics as shown in Figure 4-12.

<b>Statistics</b>	6/28/2003 12:32:41	19	1.0	19	2	17	2
	6/28/2003 12:33:42	16	1.0	16	3	14	3
	6/28/2003 12:34:43	20	1.0	20	3	18	3
	Average	12.4	1.0	12.5	2.9	11.1	2.6
	Maximum	120	1.0	121	16	108	14
	Minimum	0	1.0	0	0	0	0
	Standard Deviation	12.3	0.0	12.4	2.0	11.1	1.8

**Figure 4-13 Data Table Statistics Summary**

## Data Status

When recorded data contains error conditions, it will be displayed on the data table in different color(s) so that you can easily identify it.

Data Status colors are as follows in order of priority.

- 1) Instrument Malfunction (purple)
- 2) Laser Status (purple)
- 3) Flow Status (blue)
- 4) Instrument Overflow (orange) Overflow occurs when particle counts on the instrument exceed its maximum count.

**Data Table**

Signature: Administrator  
7/1/2003 00:00:00 to 7/6/2003 14:03:00

Time Stamp	Location 2 0.3 micron (Counts)	Location 2 0.3 micron (p/ft <sup>3</sup> )	Location 2 0.5 micron (Counts)	Location 2 0.5 micron (p/ft <sup>3</sup> )	Location 2 Temperature (F)	Location 2 Sample Time (s)
7/6/2003 14:01:24	1555	186600.0	800	96000.0	75.2	5
7/6/2003 14:01:30	800	96000.0	400	48000.0	75.2	5
7/6/2003 14:01:36	1555	186600.0	800	96000.0	75.6	5
7/6/2003 14:01:42	800	96000.0	400	48000.0	75.2	5
7/6/2003 14:01:48	1555	186600.0	800	96000.0	75.2	5
7/6/2003 14:01:54	800	96000.0	400	48000.0	75.6	5

**Data Status**

Figure 4-14 Data Table Showing Data Status

If any compromised data is displayed during a given time range, the summary section of the Data table will also report the compromised data and contain additional rows for each type of compromised data.

Average	14186.8	1979.6	79.5	43.4
Maximum	14841	2151	79.6	43.7
Minimum	13582	1857	79.1	43.3
Standard Deviation	404.4	90.7	0.2	0.1
Instrument Malfunction	True	True	NA	NA
Service Laser	True	True	NA	NA

Figure 4-15 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.

Data Status tooltip messages include:

- Instrument malfunctioned
- Service Laser
- Bad flow rate
- Instrument data overflowed

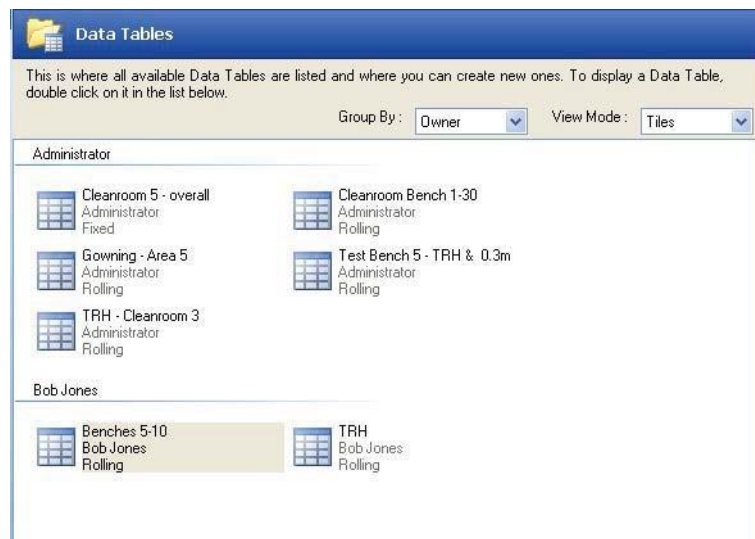
### Displayed Decimals and Units

The number of decimal places shown in the Data Table depends on the selected data set and units. See the Application Properties section of this manual for how to set the display units.

### Displaying Existing Data Tables

If you have created one or more Data Tables, the names of the Data Tables are displayed in the Data Table view.

**Note:** Administrators can see all Data Tables users and administrators have created. By default users can see only their own Data Tables unless an Administrator changes a Data Table to be viewable by "Everyone (Public)"



**Figure 4-16 List of Data Tables (Administrator User)**

Use the Group By and View Mode lists to sort and display the Data Tables in different ways.

A list of all Data Tables the user can access is also available under Data Tables in the Navigation Panel.

## Printing

---

### Printing Data Table

When the Data Table is viewed you can print it by clicking on the Print button on the toolbar.

1. View Data Table.
2. Click on the Print button.
3. On the default print window select your printer and click OK to print the Data Table.

## Exporting Data

---

Data can be exported to several different file types.

### Exporting Data Tables

A data table can be saved to an Microsoft Excel (\*.xls) or comma separated value file (\*.csv) by following these steps,

1. View the Data Table.
2. Click the Save As button on the Toolbar.
3. On the Save As window that appears, 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 or \*.csv.
6. Click on Save.



# Chapter 5 Maps

This chapter describes how to create and display real-time maps. To create and display maps, LMS Express RT must be installed.

## Maps

LMS Express RT users can create and edit map, drag and drop up to 50 data sets or instruments onto each map and assign a bitmap background to each map.

When displayed, maps update real-time. If alarm triggers are enabled as well or alarm groups are displayed, maps show the status for each data set or alarm group and the worse status per instrument.

Each map can be viewed by either everyone (Public) or by only by its owner and/or administrator users.

To display or create a map, first display the Map view by clicking the Home button and then the Maps option on the Home menu.

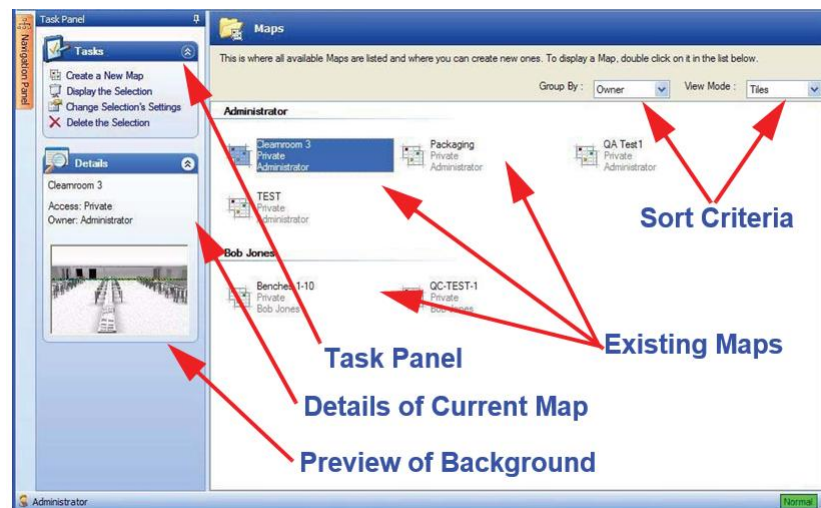
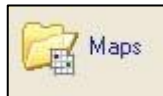
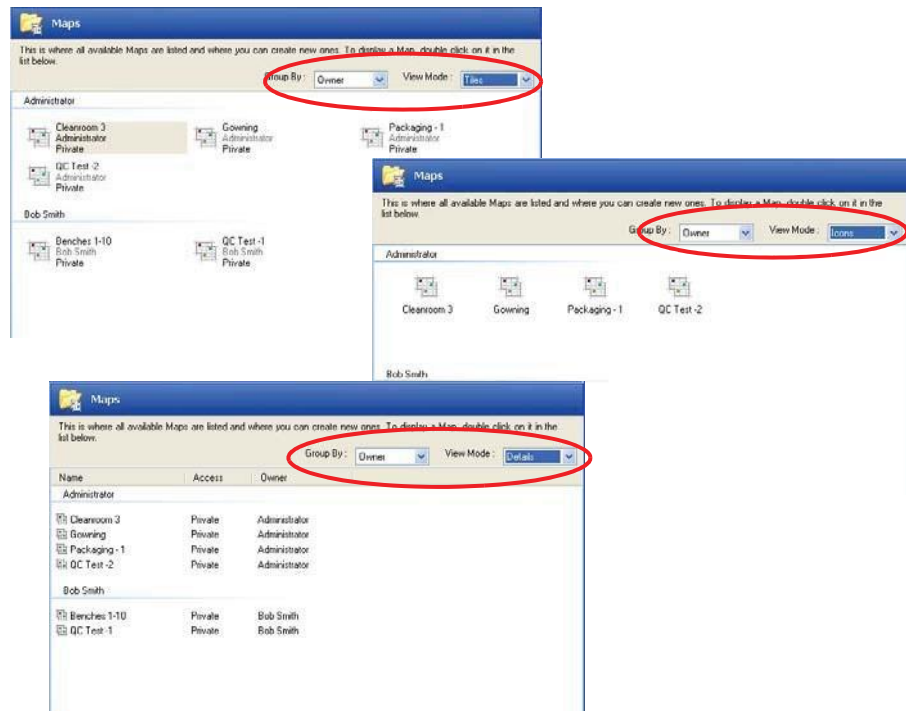


Figure 5-1 Map View

## Sort Criteria

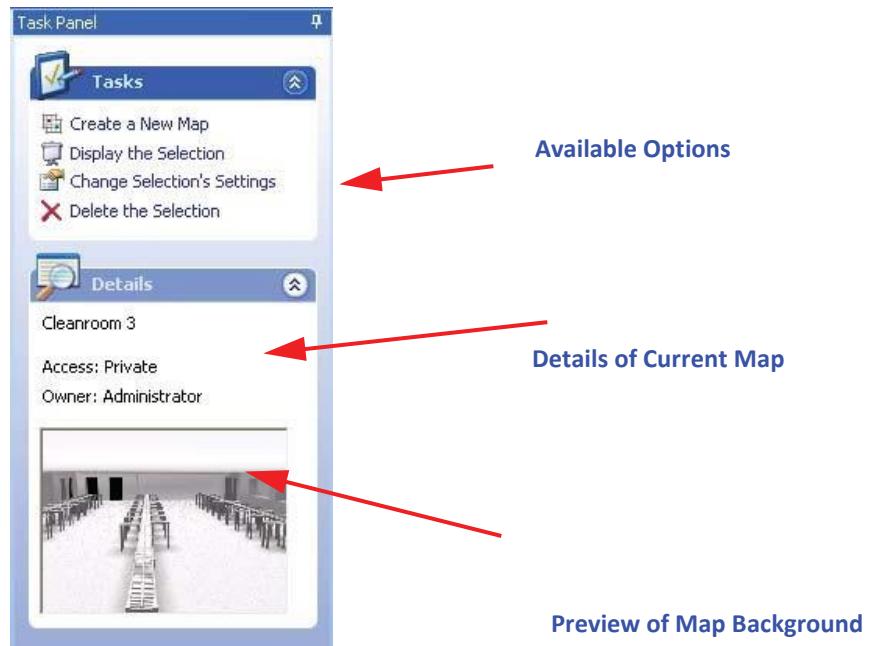
Existing maps can be sorted by several types of group criteria (<None>, Access or Owner) and displayed as icons, tiles, or detailed records.



**Figure 5-2 Sort By Criteria and Results**

## Task Panel

When a map, or list of maps, is displayed in the view, the Map's Task Panel appears on the left side of the LMS Express RT window.



**Figure 5-3 Task Panel Example**

The Map Task Panel contains two sections: Tasks and Details.






Under the Tasks section users can:

- Create a new map
- Display an existing map
- Change the selected map's settings
- Delete the map.

Under the Details section, users see details about the currently selected map, including its name, who can access it, who owns it and a preview of its background.

### Tool Bar Buttons

When the Map view is displayed, the following toolbar buttons are enabled:

Button	Function
	<b>New:</b> Create a new map.
	<b>Setup:</b> Opens the Setup Map dialog.
	<b>Delete:</b> Delete the current map.
	<b>Save As:</b> Opens a Save As dialog window and allows the user to export the currently displayed map to a bitmap (*.bmp), GIF (*.gif), Jpeg (*.jpg, *.jpeg), PNG (*.png) or Tiff (*.tif, *.tiff) file.
	<b>Print:</b> Opens the Printer Setup dialog and allows the user to print the currently displayed map.

**Table 5-4 Map Toolbar Buttons**

## Displaying a New Map

To create a map, follow these steps:

1. Click on “Create a New Map” on the Map Task Panel. The Setup Map window appears.

**Note:** Only Administrators can change who owns or can view a map.

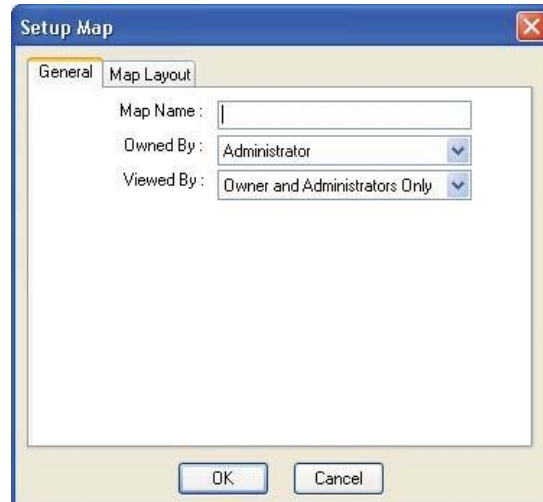


Figure 5-5 Map Setup - General Information

2. Enter a name for the map.
3. If the user is logged in as an administrator, the user can change or choose the owner of the map by selecting a user name from the Owned By list. If the user is not an administrator, this field is grayed out.
4. If the user is an administrator, the user can select which users can see the map - either just the owner and administrators, or everyone. If the user is not an administrator, this field is grayed out.

**Note:** By default, users see only maps they own or that were made public.

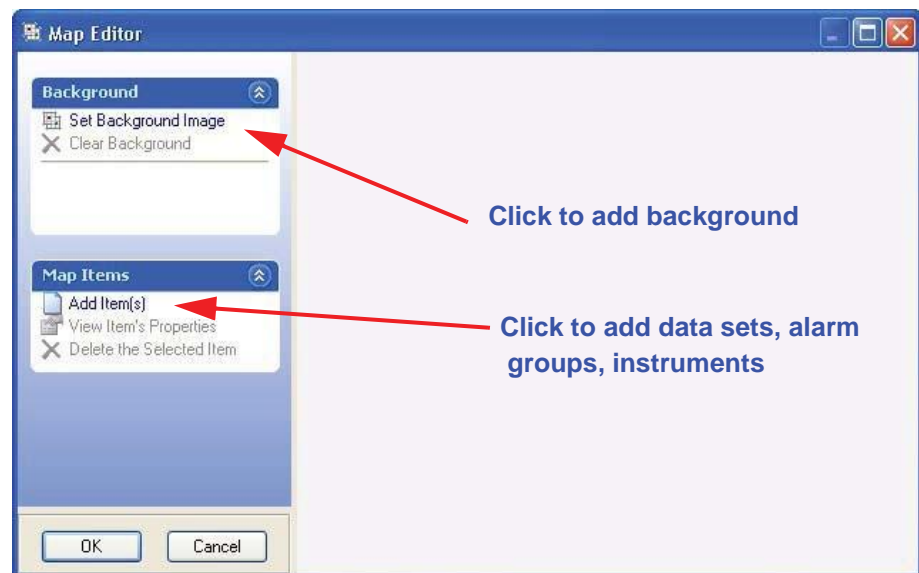
Administrators can see all maps.

- Click on the Map Layout tab. The following information displays.



**Figure 5-6 Map Setup - Map Layout**

- The Map Layout window displays a preview of the map's background (if one is assigned) and how many instruments, alarm groups, data sets and/or cameras are assigned to the map.
- To edit the map, click the Edit Map button.
- The following Map Edit window appears.



**Figure 5-7 Map Edit window - New Map**

9. Click Set Map Background Image.
10. On the Open window that appears, select a bitmap (\*.bmp), Gif (\*.gif), JPEG (\*.jpg), PNG (\*.png), or Tiff (\*.tif, \*.tiff) file to be used as the map's background.
11. After selecting the map background, click OK on the Open window to accept the selection.
12. The Map Editor window updates and displays the selected background.

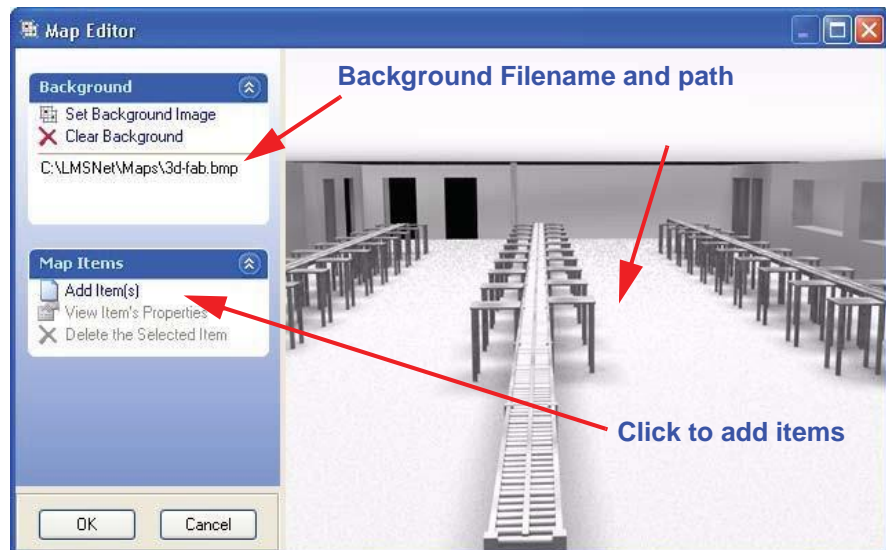


Figure 5-8 Map Editor - Background Assigned

**Note:** You can add up to 50 Data Sets, instruments, alarm groups, and cameras to each map.

13. If needed, to clear the background, click Clear Background.
14. To add a data set, alarm group, instrument or camera to the map, click Add Item(s).

15. Users can add instruments, alarm groups, data sets, and/or cameras to maps. On following window, select the type of item to add.

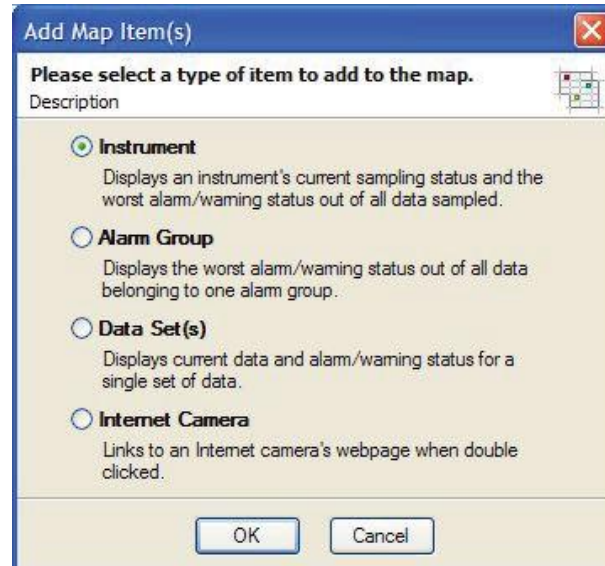


Figure 5-9 Map Editor - Add Map Items window

16. For this example, select Instrument and click OK.
17. The following Map Item: Instrument window appears.

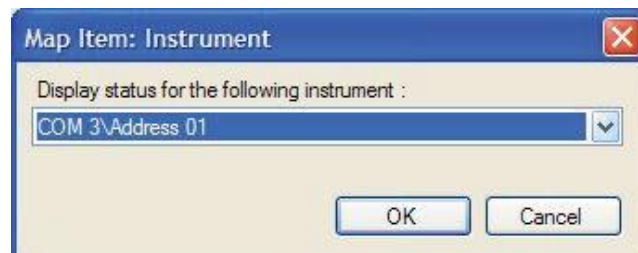


Figure 5-10 Map Editor: Add Instrument

**Note:** A map cannot have duplicate data sets, instruments, alarm groups, or cameras.

18. Select an instrument from the pull down list.
19. Click OK.
20. The instrument (or item) is added to the map. By default, map items are added in the upper left corner of the Map Editor.



21. To move a map item to a different area of the map, select it and drag and drop it. When selected, a dashed circle will appear around the item.

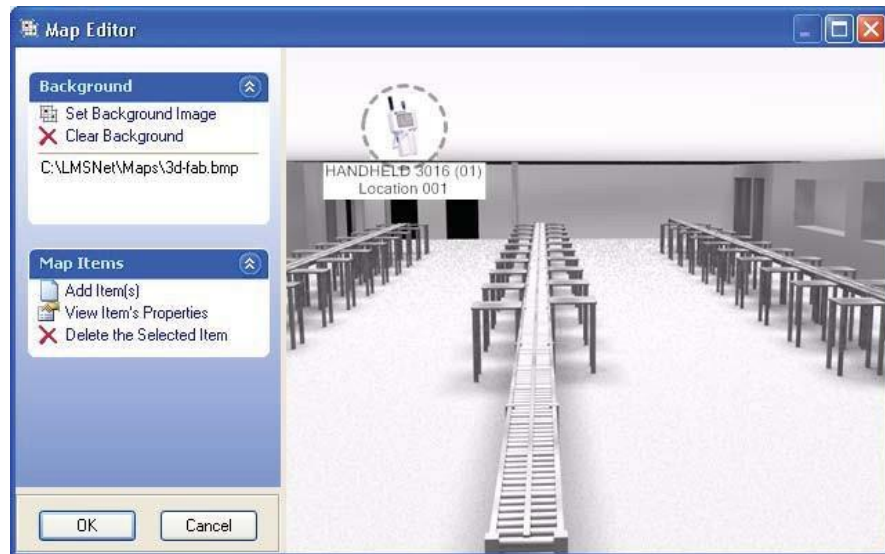


Figure 5-11 Map Editor - Selecting and Moving Map Item

**Note:** Right click on a map item in the Map Editor to show "Properties" and "Delete" options on the Map Editor Task Panel.

22. To remove an item from the map, select the item and click Delete the Selected Item.
23. To add more items, click Add Item(s) again.
24. After the user has added all the items they desire to the map, click the OK button to save the changes and close the Map Editor.
25. Click OK on the Setup Map window to close and save the map.

26. To display the map, double click on the map's name in the Map view area or select the map and click Display the Selection on the Task Panel.



**Figure 5-12 New Map – Displayed**

## Displaying Existing Maps

If you have created one or more maps, the names of the maps are displayed in the map view.

**Note:** Administrators can see all maps users and administrators have created. By default, users can see only their own maps unless an Administrator changes a map to be viewable by "Everyone (Public)".

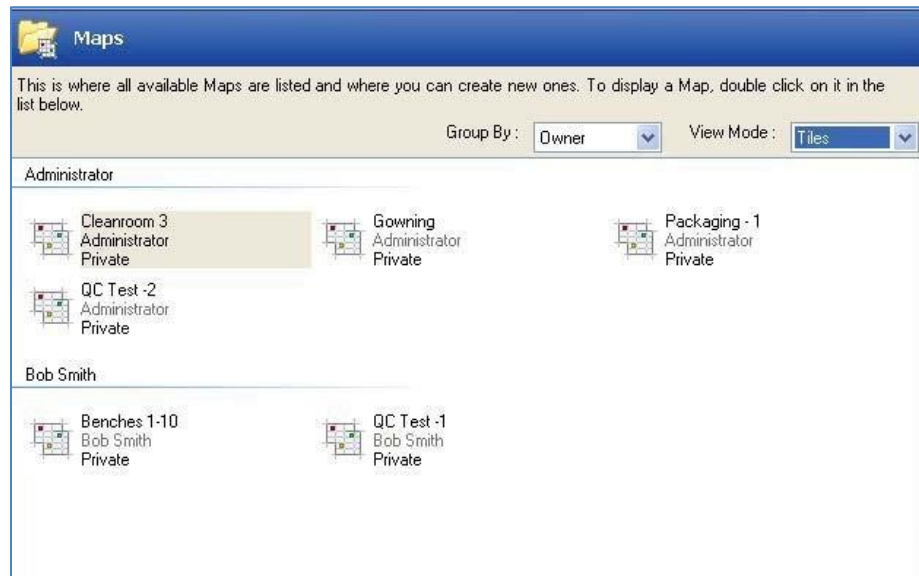


Figure 5-13 Map View - List of Maps (Administrator User)

Use the Group By and View Mode lists to sort and display the maps in different ways.

A list of all maps the user can access is also available in the Navigation Panel under the Maps folder.

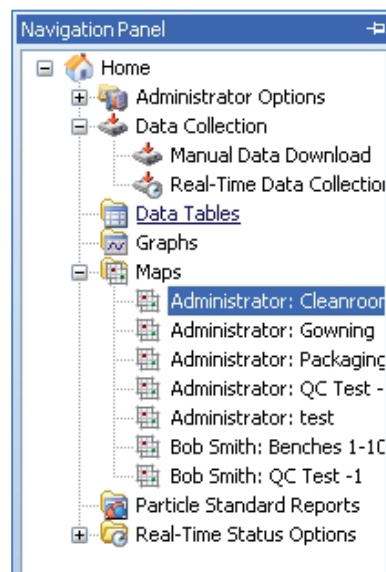


Figure 5-14 Navigation Panel - Maps (Administrator User)

**Note:** Everyone can view a map that is set to "Everyone ("Public)." Only Administrators can view maps that are set to "Owner and Administrators Only".

In the Navigation Panel, map names are prefaced by the user name.

For example,

Bob Smith: QC Test - 1

Administrator: Gowning

To display another, existing map, double click on it on the Map view or Navigation Panel.

## Map Real Time Status View

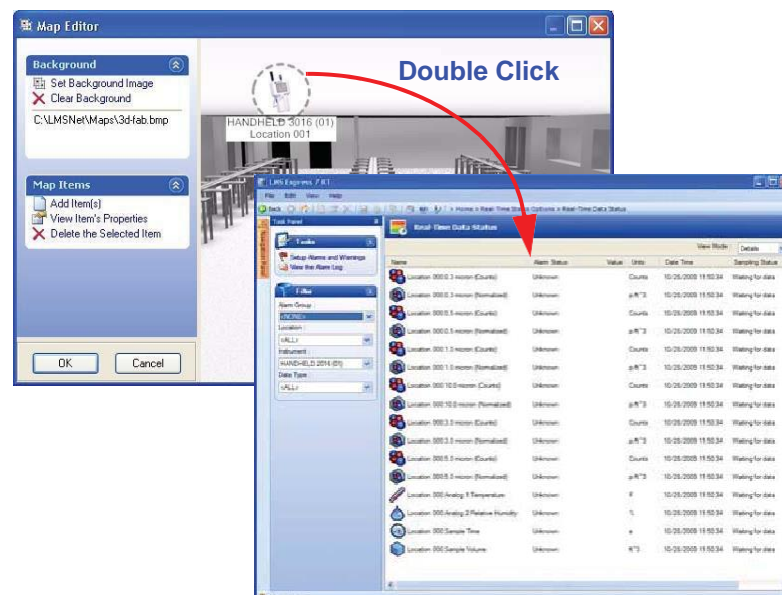
When a map is displayed, the names of the instrument(s), camera(s), alarm group(s), and/or data set(s) are displayed under the icon for each map item. The last recorded value is also displayed for each data set and the status for each alarm group.

## Instrument Status View

To see the real-time status of all data sets associated with the instrument, double click on an instrument on the map.

Figure 5-14, below, is an example.

**Note:** Maps will show data collection errors for instruments, data sets and alarm groups.



**Figure 5-15 Map Display - Instrument Status**

## Data Status View

To see details of a data set's real-time status, double click on a data set on the map. See below for an example.



Figure 5-16 Map Display - Data Set Status

## Alarm Group Status

To see details of an alarm group's real-time status, double click on an alarm group on the map like below.

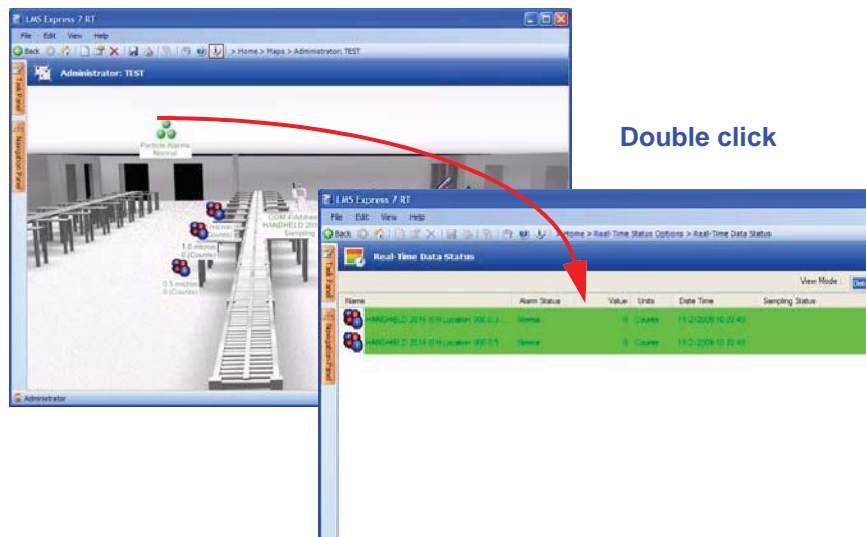


Figure 5-17 Map Display - Alarm Group Status

## Camera View

**Note:** The example at right is just one sample web page for a camera.

To view a camera, double click on a the camera's icon on the map. This opens its assigned URL in the camera's default WEB browser.

See the below example.

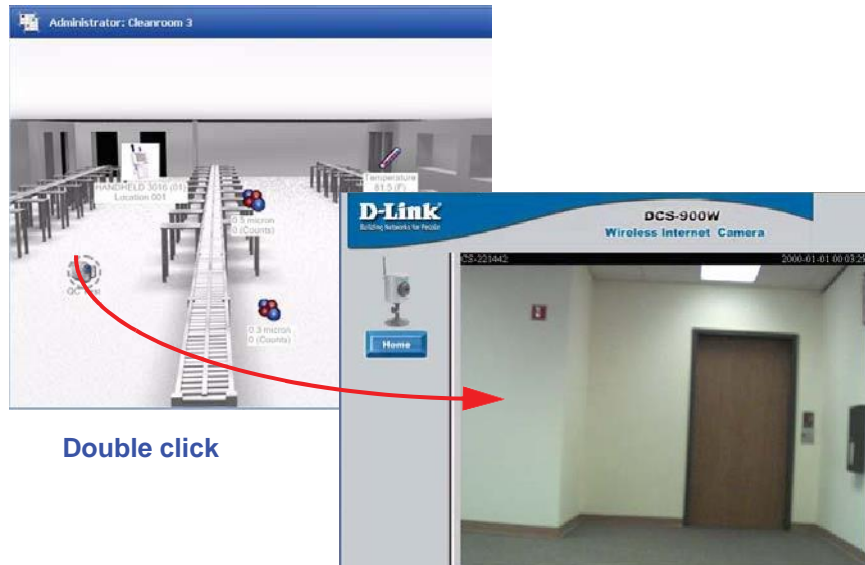


Figure 5-18 Map Display - Camera



## Printing Maps

When the map is viewed users can print it by clicking on the Print button on the toolbar.

1. Display the map.
2. Click Print this Map on the Task panel, or click the following Print on the toolbar.
3. On the default print window that appears, select a printer and click OK.

### Export Map Data



To save the map as a Bitmap, Gif, JPEG, PNG, or Tiff file, follow these steps:

1. Display a map.
2. Click Save to Image file on the Task Panel, or click on the following Save As button on the toolbar.
3. On the Save As window that appears, select the file type to save to: Bitmap (\*.bmp), Gif (\*.gif), JPEG (\*.jpg, \*.jpeg), PNG (\*.png), or Tiff (\*.tif, \*.tiff).
4. Use the navigation tools at the top of the dialog box to select the directory into which to save the file.
5. Enter a name in the “File Name” field.
6. Click Save.

Blank Page



# Chapter 6 Report Display

## Standard Reports

---

This chapter describes how to display data in **Express** Standard Reports.



**Express** output reports covering the following standards for cleanliness: Federal Standard 209E (Fed Std 209E), ISO 14644-1 revisions 1999 and 2015, European Union Good Manufacturing Practices (EU GMP) Annex 1 revisions 2003 and 2009, and British Standard 5295 (BS-5295).

Each report analyzes the conformance of the data according to the selected class level, room area, room status, room's air flow, instruments used, number of locations, number of samples and volume of air. The room is assigned a classification. For the Federal Standard 209E report each particle size is also assigned a classification.

**Note:** Included Standard Reports apply to airborne particle data, only. They will not use or show LPC particle sizes or data.

Data collected under compromised conditions, such as insufficient flow or laser voltage or when the instrument's service light is on, is excluded from reports.

## Report View

Click the Home button and the Particle Standard Reports icon on the Home view to access Standard Reports.

**Note:** Particle sizes that do not apply to a given standard or its current class levels cannot be classified. Non-conforming values are highlighted in red.

Standard Reports can be either viewed by either everyone (Public) or only by owner and administrator.

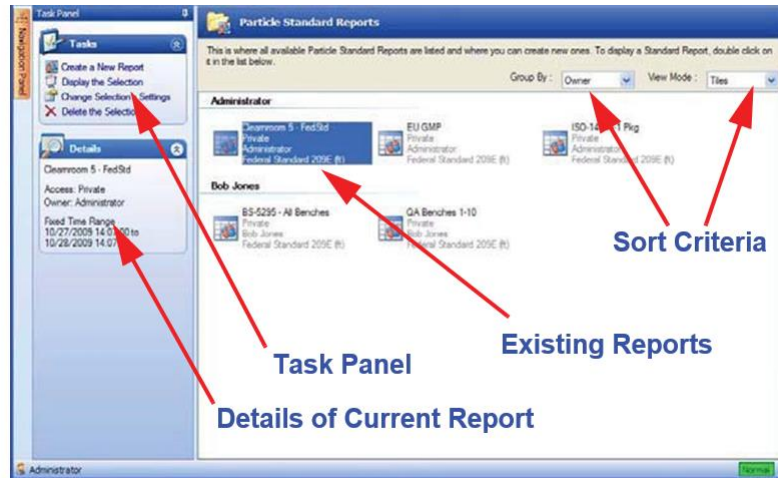


Figure 6-1 Particle Standard Reports View.

### Sort Criteria

Existing Standard Reports can be sorted by several types of group criteria (<None>, Access, Owner, or Standard) and displayed as icons, tiles, or detailed records.

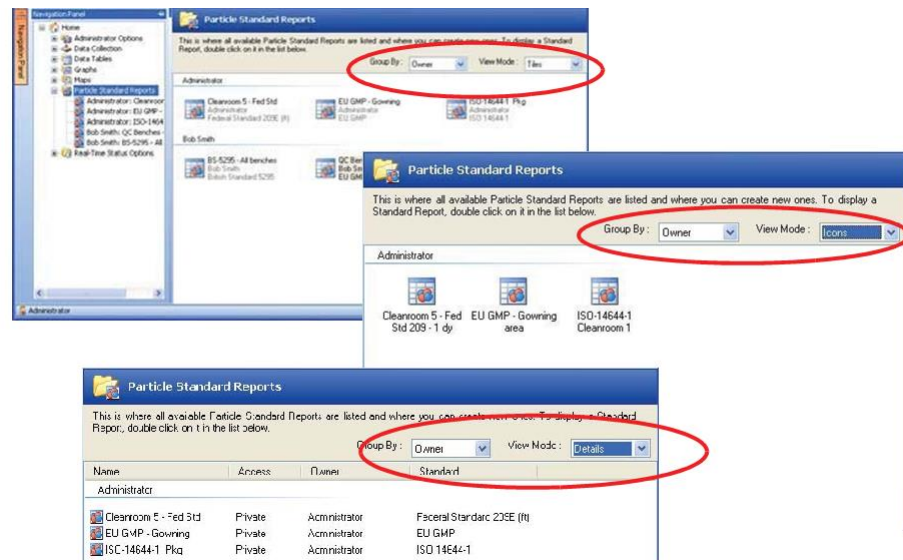
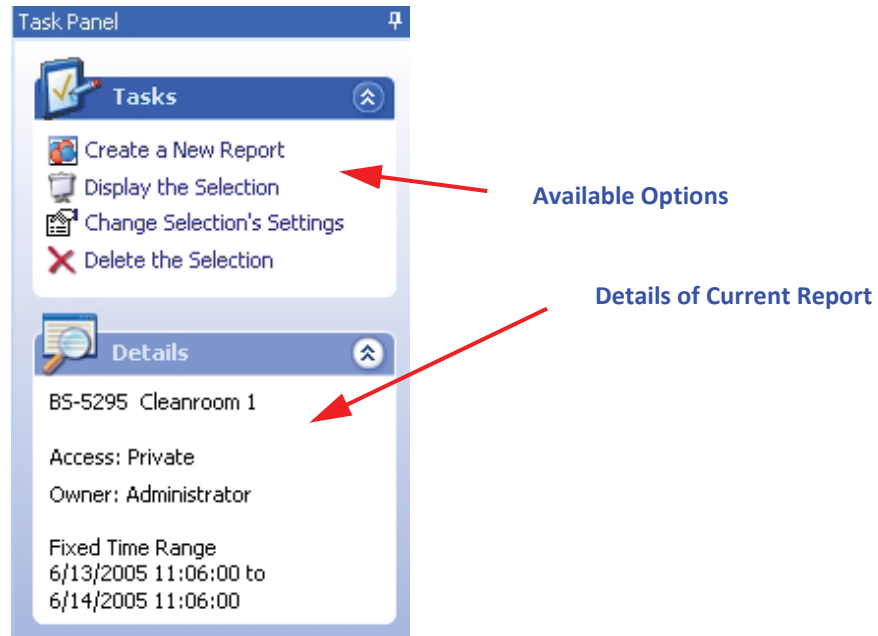


Figure 6-2 Sort By Criteria and Results

## Task Panel

When a Standard Reports, or list of Standard Reports, is displayed in the View, the Standard Reports Task Panel appears on the left side of the **Express** window.



**Figure 6-3 Standard Reports - Task Panel**

The Standard Reports Task Panel contains two sections: Tasks and Details.







Under the Tasks section users can:

- Create a new report
- Display an existing report
- Change the selected report's settings
- Delete a report

Under the Details section, users see details about the currently selected report, including its name, who can access it, who owns it and its time range (fixed or rolling).

### Tool Bar Buttons

When the Standard Report view is displayed the following toolbar buttons are enabled.

Button	Function
	<b>New:</b> Create a new standard report.
	<b>Setup:</b> Opens the Setup Standard Report dialog.
	<b>Delete:</b> Delete the current standard report.
	<b>Save As:</b> Opens a Save As dialog window and allows the user to export the currently displayed report to a Microsoft Excel, (*.xls) or Comma Separated Value file (*.csv)
	<b>Print Preview:</b> Opens a Print Preview dialog window and allows the user to setup page dimensions and print.
	<b>Print:</b> Opens the Printer Setup dialog and allows the user to print the currently displayed standard report.

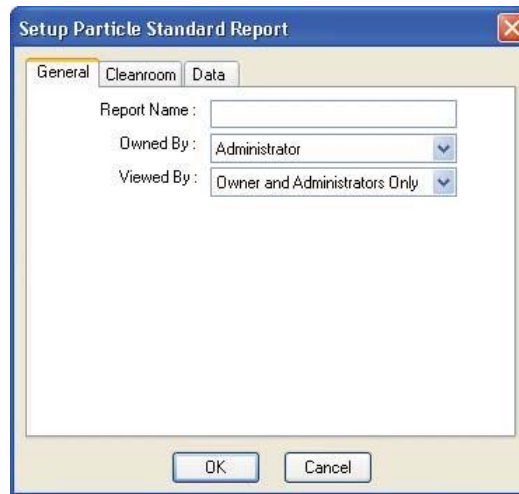
**Table 6-4 Standard Report Toolbar Buttons**

### Displaying Report Data

To display data in a particular Standard Report immediately, double click on it in the Particle Standard Reports view.

To see the reports setup, select the report in the Particle Standard Reports view and click the Setup button on the toolbar or click the New Tool bar button to create a new report.

The following Setup Report window appears:

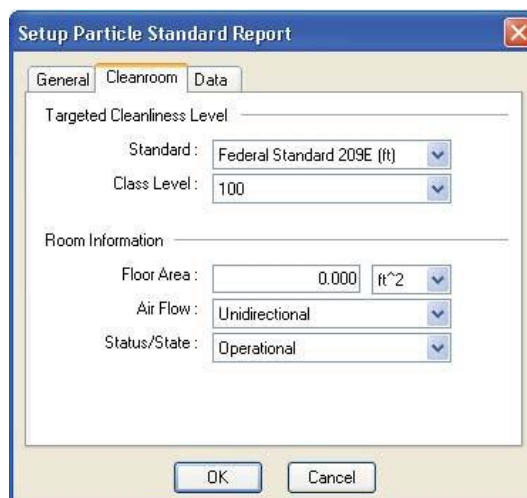


The image shows a software window titled "Setup Particle Standard Report" with a close button (X) in the top right corner. It has three tabs: "General", "Cleanroom", and "Data". The "General" tab is selected. Inside the "General" tab, there are three fields: "Report Name:" followed by a text input box, "Owned By:" followed by a dropdown menu showing "Administrator", and "Viewed By:" followed by a dropdown menu showing "Owner and Administrators Only". At the bottom of the window are "OK" and "Cancel" buttons.

**Figure 6-5 Setup Report window - General Information**

1. Enter a name for the report in the Report Name field.
2. If the user is logged in as an administrator, the user can change or choose the owner of the report by selecting a user name from the Owned By list. If the user is not an administrator, this field is grayed out.
3. If the user is an administrator, the user can select which users can see the report - either just the owner and administrators, or every- one. If the user is not an administrator, this field is grayed out.
4. Click the Cleanroom tab. The following window appears,

**Note:** By default, users see only reports they own or that were made public. Administrators can see all graphs.

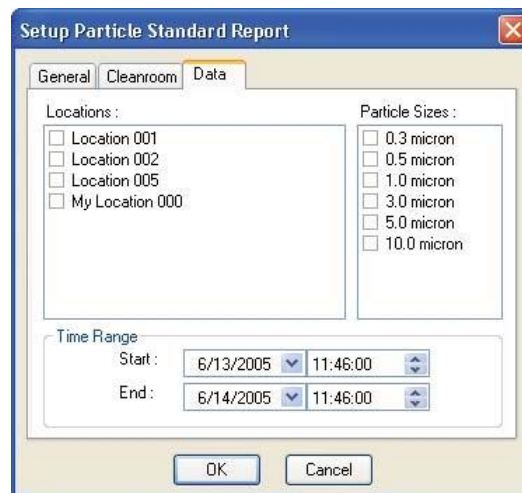


The image shows the same "Setup Particle Standard Report" window, but with the "Cleanroom" tab selected. The "General" tab is now grayed out. The "Cleanroom" tab contains two sections. The first section, "Targeted Cleanliness Level", has "Standard:" with a dropdown menu showing "Federal Standard 209E (ft)" and "Class Level:" with a dropdown menu showing "100". The second section, "Room Information", has "Floor Area:" with a text input box showing "0.000" and a unit dropdown menu showing "ft^2", "Air Flow:" with a dropdown menu showing "Unidirectional", and "Status/State:" with a dropdown menu showing "Operational". At the bottom are "OK" and "Cancel" buttons.

**Figure 6-6 Setup Report window - Cleanroom Information**

**Note:** The available cleanroom states or status will vary based on the standard selected.

5. In the Targeted Cleanliness Level section, select a standard and a class level from the available pull down lists. Class levels vary per selected standard.
6. In the Room Information section, enter information about the cleanroom, including the room area, units of measure for the room area (ft<sup>2</sup> or m<sup>2</sup>), type of air flow (Unidirectional or Nonunidirectional) and the cleanroom's state or status.
7. Click on the Data tab. The following Data window appears.



**Figure 6-7 Setup Report - Data Information**

**Note:** At least one location must be checked; the number of locations required depends on the standard selected.

**Note:** At least one particle size must be checked; the number of particle sizes required is determined by the software when the report is built.

8. Check the locations you want to report on.
9. Check the particle size(s) you want to report on.
10. Enter the start date and time of the sample set.
11. Enter the end date and time of the sample set.
12. Click the OK button to display the report or click the Cancel button to close the Setup Report window without displaying the report.

**Tip:** Data that is collected under compromised conditions, such as insufficient flow or laser voltage or when the instrument's service light is on, is excluded from reports.

## Report Display

When **Express** finishes calculating values for the selected report, the Report view area is updated with the newly calculated report.

While the data content of each report is different, the Report view area has similar sections for all reports, as described below.

Each Standard Report contains five sections:

- Report Header.
- Particle Counter(s) used.
- Cleanroom Information.
- Concentration Tables of Selected Particle Sizes.
- Classification Errors (if any exist).

Below are details about the information displayed in each section of the Report view.

### Report Header

The top of every report includes the following header:

<b>Federal Standard 209E (ft)</b>
Targeted Class Level: 100
Created On: 6/14/2005 15:13:09
6/10/2005 13:42:00 to 6/11/2005 13:42:00

**Figure 6-8 General Report Header, Report view**

Each Standard Report header contains the following fields:

**Targeted Standard and Class:** These values were selected on the Report Setup window and represent the cleanliness level specified for the cleanroom.

**Note:** Fields which do not meet the targeted class level are highlighted in red in the report.

**Created On:** The Created On field displays the date and time the report was created.

**Data Range:** The Data Range field displays the start and end time the user selected in the Report Setup window.

## Particle Counter(s) Used

All the standards for which **Express** can generate reports require information about the instruments used to collect data for the report. The Particle Counter(s) Used section of the Report View provides information about each instrument that was used to record data included in the current report.

Particle Counters Used
SolAir 3100+ (Serial #030303006)
SolAir 3100+ (Serial #030304011)
SolAir 3100+ (Serial #030603013)
SolAir 3100+ (Serial #030604106)
SolAir 3100+ (Serial #030604116)

Figure 6-9 Particle Counter(s) Used section, Report view

If samples from more than one instrument exist for the same location for the same time, their samples are combined for the report. Using multiple instruments can make sampling very large rooms with many locations easier and more time efficient.

**Note:** If all the data from a particular instrument has been excluded from a report, that instrument is not shown in the Particle Counter(s) Used section.

The name of each instrument and its serial number is displayed in this section of the Report View. The name used for the instrument is the instrument name the user defined in the Instruments view. By default, the instrument name is "<Model><Model Number>".

## Cleanroom Information

The Cleanroom Information section of the Report View displays information about the cleanroom being classified.

Cleanroom Information
Floor Area: 5.000 m^2
Air Flow: Unidirectional
State: Operational
Classification: Pass

Figure 6-10 Cleanroom Information Section, Report View

**Floor Area:** The Floor Area is the square area of the cleanroom that the user entered on the Report Setup window. The value entered for Floor Area is automatically converted to the standard's required units.

**Air Flow:** The Air Flow value displayed is the value the user entered on the Setup Report window. "Unidirectional" means the air flow in the room is in only one direction. "Non-unidirectional" means the cleanroom has multiple air flows.



**Occupancy Status/State:** Depending on the report selected, this field on the Report view is either "State" or "Status". This field indicates the operational status of the cleanroom and is titled either "Cleanroom Status" for the Federal Standard 209E report or "Operational State" for all other standards.

The Fed Std 209E standard defines Cleanroom Status as:

As-Built A cleanroom (facility) that is complete and ready for operation, with all services connected and functional, but without equipment or operating personnel in the facility.

At-Rest A cleanroom (facility) that is complete, with all services functioning and with equipment installed and operable or operating, as specified, but without operating personnel in the facility.

Operational A cleanroom (facility) in normal operation, with all services functioning and with equipment and personnel, if applicable, present and performing their normal work functions in the facility.

One of the above cleanroom statuses must accompany the report. None of these statuses affect the report's calculations. The descriptions of the above statuses are direct quotes from the standard.

The ISO-14644-1:1999 and ISO-14644-1:2015 standard defines Occupancy State as:

As-Built Condition where the installation is complete with all services connected and functioning but with no production equipment, materials, or personnel present.

At-Rest Condition where the installation is complete with equipment installed and operating in a manner agreed upon by the customer and supplier, but with no personnel present.

Operational Condition where the installation is functioning in the specified manner, with the specified number of personnel present and working in the manner agreed upon.

**Note:** ISO 14644-1 occupancy states are equivalent to Federal Standard's cleanroom statuses.

One of the above states must accompany the report. These states do not affect the report's calculations. The descriptions above are direct quotes from the standard.

The British Standard 5295 standard defines Occupancy State as:

As-Built On completion, prior to moving in.

Unmanned Operational, but not in use.

Manned In full operational use.

One of the above states must accompany the report. These states do not affect the report's calculations.

**Note:** BS 5295 Occupancy States are equivalent to Federal Standard's cleanroom statuses.

The EU GMP standard defines Occupancy State as:

At-Rest Condition where the installation is installed and operating, complete with production equipment but with no operating personnel present.

Operational Condition where the installation is functioning in the defined operating mode with the specified number of personnel working.

One of the above states must accompany the report. These states determine which concentration limit are used in the table in Appendix A. The descriptions above are direct quotes from the standard.

**Note:** EU GMP Occupancy States are equivalent to Federal Standard's cleanroom statuses.

**Classification:** The Classification field displays "Pass" or "Fail" against the targeted class level after LMS Express analyzes the provided concentration tables displayed below this section of the report

The Classification is listed as "Out of Range" if the sampled data exceeds all of the standard's class limits. The Classification is listed as "Cannot Classify" if the user did not sample the data according to the standard's requirements. The Classification field and value displays in red if the data sampled does not meet the targeted class level or if it cannot be classified.

Cleanroom Information	
Floor Area: 0.186 m <sup>2</sup>	
Air Flow: Unidirectional	
State: Operational	
Classification: Out of Range	Classification

Figure 6-11 Classification for Data Not Meeting Targeted Class Level

## Concentration Tables of Selected Particle Sizes

A concentration table is generated and displayed in the Report view for each particle size the user selected in the Setup Report window.

**Note:** All values which do not meet the targeted class level are displayed in red

Particle Size: 0.5 micron			
Location	Samples	Min Volume (L)	Average p/m <sup>3</sup>
Location 001	5	1602.734	0.4
Location 002	1	1602.734	0.0
Location 003	1	1602.734	0.0
Location 004	1	1602.734	1.2
Location 005	1	1602.734	82116.6
Location 006	1	1602.734	79530.4
Location 007	1	1602.734	84638.5
Location 008	1	1602.734	82727.4
Mean			41126.8
Maximum			84638.5
Minimum			0.0
Standard Deviation			43987.7
Standard Error			15552.0
95% UCL			70675.6
Class Limit			352000.0
Min Sample Volume Limit (L)			6.826
Classification			Pass

Figure 6-12 Concentration table

A concentration table lists all the locations selected for a given particle size. The following information is displayed for each particle size:

**Samples:** The number of samples taken at that location by one or more instruments. Samples which do not meet the standard's sampling methods are excluded from this table.

**Min Volume:** The Minimum Volume column displays the smallest volume of air sampled at that location. Since data can come from multiple instruments and it is possible (but not recommended) to sample in manual mode, each sample can potentially have a

different volume of air. Samples which do not meet the minimum volume of air as defined by the standard are excluded from the concentration table.

**Average Concentration:** This field displays the result of averaging all the accepted concentrations taken at that location.

**Statistics:** The block of statistics displayed below the locations calculates the data shown in the average concentration column and is required by the standards. Only the Federal and ISO 14644-1 (1999 revision) Standard Reports displays “Standard Error”, “95% UCL” and Classification fields. All fields which do not meet the targeted class level are displayed in red.

### Classification Errors

If the report encounters errors with the amount of data or locations needed for the desired report or finds that it has to exclude some data samples, the errors and/or reasons why data was excluded are listed below the concentration table for each affected channel size. For example:

Excluded samples:
- With volumes of air less than 0.2 ft <sup>3</sup> .
Unable to classify:
- Must take at least 5 sample(s) in cleanroom.
- Must take at least 1 sample(s) per location.

**Figure 6-13 Classification Error example**

### Excluded Data

If a concentration table encounters samples in the selected data range which do not conform to the selected standard, the non-compliant samples are noted and excluded from the displayed report.

Reports exclude non-compliant samples so that if valid samples are mixed in with invalid samples, the valid samples can still be used in the classification calculations. A list of the reasons samples were excluded is displayed under the concentration table and titled "Excluded Samples".

Data is excluded if it was:

- Measured during instrument failure (Bad Status).
- Measured with bad laser voltage.
- Measured with bad flow rate.
- Recorded with a sample time that is less than the required time.
- Recorded with a sample volume of air less than required.
- Measured from instrument(s) with flow rates less than the required flow rate.

## Cannot Classify

If the classification field ever reads "Cannot Classify", then the data was either not sampled correctly or the number of samples and locations do not meet the minimum required by the targeted standard. Whenever a "Cannot Classify" appears on a Report view, a list of the reasons why the data cannot be classified is listed below the concentration table, in a section entitled "Unable to classify".

The possibilities why **Express** could not classify the data include,

- The selected standard and class does not support the given particle size.
- Data must be sampled from at least [required] location(s).
- There must be at least [required] sample(s) in cleanroom.
- There must be at least [required] sample(s) per location.

Classification errors are displayed so the user can see why the samples did not conform to the selected standard, allowing the user to recollect valid samples, correct the report configuration and rebuild the report.

Information and examples of specific Standard Reports are included below.

### Federal Standard 209E

To display the Federal Standard 209E report, follow these steps:

1. Click on the Home button and then Particle Standard Reports on the Home view's menu.
2. Click on New to create a new report. On the Setup Particle Standard Report window, enter a name for the report, on the cleanroom tab select Federal Standard 209E for the report's standard. You can select either Federal Standard 209E (ft), shown below on the left or Federal Standard 209E (m).
3. Select which Class Level to report. The default for the Federal Standard report is 100 for Federal Standard 209E (ft) and M2 for Federal Standard 209E (m).
4. Enter the area of the cleanroom and select units of either ft<sup>2</sup> or m<sup>2</sup>.
5. Select air flow and status values.

**Note:** Federal Standard 209E (ft.) is the cubic feet version and Federal Standard 209E (m) is the cubic meters version of the Federal Standard 209E report

6. Select which Locations and Channel Sizes you want to analyze.  
This standard accepts all particle sizes. The number of locations required for a report to successfully run depends in part on the cleanroom area for which the report is being generated.
7. Select a data range Start and End date/time.
8. Click OK to build report.

Federal Standard 209E (ft)			
Targeted Class Level: 10,000			
Created By: Administrator			
Created On: 6/13/2016 10:45:59			
5/2/2016 14:00:00 to 5/2/2016 14:50:00			
Particle Counter(s) Used			
ApexRS (01) (Serial #1402100007)			
Cleanroom Information			
Floor Area: 100.000 ft <sup>2</sup>			
Air Flow: Unidirectional			
Status: Operational			
Classification: Pass			
Particle Size: 0.5 micron			
Location	Samples	Min Volume (ft <sup>3</sup> )	Average p/ft <sup>3</sup>
Location 001	5	56.600	0.0
Location 002	1	56.600	0.0
Location 003	1	56.600	0.0
Location 004	1	56.600	0.0
Location 005	1	56.600	2325.3
Location 008	1	56.600	2342.6
Location 009	1	56.600	2365.1
Location 010	2	4.717	1971.6
Mean			1125.6
Maximum			2365.1
Minimum			0.0
Standard Deviation			1209.5
Standard Error			427.6
95% UCL			1938.1
Class Limit			10000.0
Min Sample Volume Limit (ft <sup>3</sup> )			0.100
Classification			Pass

**Figure 6-14 Sample Fed Std 209E (ft) Report**

<b>Federal Standard 209E (m)</b>			
Targeted Class Level: M5.5			
Created By: Administrator			
Created On: 6/13/2016 10:49:08			
5/2/2016 14:00:00 to 5/2/2016 14:50:00			
<b>Particle Counter(s) Used</b>			
ApexR5 (01) (Serial #1402100007)			
<b>Cleanroom Information</b>			
Floor Area: 10,000 m <sup>2</sup>			
Air Flow: Unidirectional			
Status: Operational			
Classification: Pass			
<b>Particle Size: 0.5 micron</b>			
Location	Samples	Min Volume (m <sup>3</sup> )	Average p/m <sup>3</sup>
Location 001	5	1.603	0.4
Location 002	1	1.603	0.0
Location 003	1	1.603	0.0
Location 004	1	1.603	1.2
Location 005	1	1.603	82116.6
Location 006	1	1.603	79530.4
Location 010	2	0.134	69627.3
Location 014	2	0.134	18.7
Mean			28911.8
Maximum			82116.6
Minimum			0.0
Standard Deviation			40051.8
Standard Error			14160.4
95% UCL			55816.7
Class Limit			353000.0
Min Sample Volume Limit (m <sup>3</sup> )			0.003
Classification			Pass

Figure 6-15 Sample Fed Std 209E (m) Report

## ISO 14644-1 Report

LMS Express supports the 1999 and 2015 revisions of the ISO 14644-1 standard report.

To display a ISO 14644-1 report, follow these steps:

1. Click on the Home button and then Particle Standard Reports on the Home view's menu.
2. Click on New to create a new report.
3. On the Setup Particle Standard Report window, enter a name for the report. On the cleanroom tab select one of the two ISO-14644-1 reports in the list. Select the ISO 14644-:2015 revision unless required to report based on the 1999 revision.
4. Select which Class Level to report. The default for the ISO 14644-1 report is 5.
5. Enter the area of the cleanroom and select units of either ft<sup>2</sup> or m<sup>2</sup>.
6. Select air flow and status values.
7. Select which Locations and Channel Sizes you want to analyze. The number of locations required for a report to successfully run depends in part on the cleanroom area for which the report is being generated.
8. If the ISO 14644-1:2015 revision is selected, Class 5 is selected as the targeted class, and channel size 5.0u is selected, the report will include M Descriptor information (only) for the 5.0u channel size.
9. Select a data range Start and End date/time.
10. Click OK to build report

**Note:** If the ISO 14644-1:2015 revision is selected, Class 5 is selected, and channel size 5.0u is selected, the report will include M Descriptor information for the 5.0u channel size and will not use the 5.0u channel to determine the cleanroom's class



<b>ISO 14644-1</b>			
Targeted Class Level: 7			
Created By: Administrator			
Created On: 2016-06-13 11:05:42			
2016-05-02 14:00:00 to 2016-05-02 14:50:00			
<b>Particle Counter(s) Used</b>			
ApexR5 (01) (Serial #1402100007)			
<b>Cleanroom Information</b>			
Floor Area: 1.858 m <sup>2</sup>			
Air Flow: Unidirectional			
State: Operational			
Classification: Pass			
<b>Particle Size: 0.5 micron</b>			
Location	Samples	Min Volume (L)	Average p/m <sup>3</sup>
Location 001	5	1602.734	0.4
Location 002	1	1602.734	0.0
Mean			0.2
Maximum			0.4
Minimum			0.0
Standard Deviation			0.3
Standard Error			0.2
95% UCL			1.4
Class Limit			352000.0
Min Sample Volume Limit (L)			6.826
Classification			Pass
<b>Particle Size: 5.0 micron</b>			
Location	Samples	Min Volume (L)	Average p/m <sup>3</sup>
Location 001	5	1602.734	0.0
Location 002	1	1602.734	0.0
Mean			0.0
Maximum			0.0
Minimum			0.0
Standard Deviation			0.0
Standard Error			0.0
95% UCL			0.0
Class Limit			2930.0
Min Sample Volume Limit (L)			6.826
Classification			Pass

Figure 6-16 Sample ISO 14644-1 Report, 1999 Revision

Administrator: ISO 14644-1 2015					
<b>ISO 14644-1:2015</b>					
Date: 2016-06-13 10:26:58					
Targeted Class Level: 6					
Created By: Administrator					
Created On: 2016-05-02 18:34:37					
Operator Name: Bob Jones					
2016-05-02 14:00:00 to 2016-05-02 14:50:00					
<b>Particle Counter(s) Used</b>					
ApexR5 (01) (Serial #1402100007)					
<b>Cleanroom Information</b>					
Floor Area: 5.000 m <sup>2</sup>					
Air Flow: Unidirectional					
State: Operational					
Classification: Pass					
<b>0.5 micron</b>					
Location	Samples	Min Volume (L)	Sample Average (counts)	Average p/m <sup>3</sup>	Pass/Fail
Location 001	5	1602.734	0.6	0.4	Pass
Location 002	1	1602.734	0.0	0.0	Pass
Location 003	1	1602.734	0.0	0.0	Pass
Location 004	1	1602.734	2.0	1.2	Pass
Min Sample Volume Limit (L)					68.259
ISO Class 6 Limit					35200.0
Classification					Pass
<b>5.0 micron</b>					
Location	Samples	Min Volume (L)	Sample Average (counts)	Average p/m <sup>3</sup>	Pass/Fail
Location 001	5	1602.734	0.0	0.0	Pass
Location 002	1	1602.734	0.0	0.0	Pass
Location 003	1	1602.734	0.0	0.0	Pass
Location 004	1	1602.734	0.0	0.0	Pass
Min Sample Volume Limit (L)					68.259
ISO Class 6 Limit					293.0
Classification					Pass

Figure 6-17 Sample ISO 14644-1 Report, 2015 Revision

Administrator: ISO 14644-1 2015 M Descriptor					
<b>ISO 14644-1:2015</b>					
Date: 2016-06-13 10:29:13					
Targeted Class Level: 5					
Created By: Administrator					
Created On: 2016-05-02 11:10:52					
Operator Name: Test					
2016-05-02 14:00:00 to 2016-05-02 14:50:00					
<b>Particle Counter(s) Used</b>					
ApexR5 (01) (Serial #1402100007)					
<b>Cleanroom Information</b>					
Floor Area: 10.000 m <sup>2</sup>					
Air Flow: Unidirectional					
State: Operational					
Classification: Fail					
<b>0.5 micron</b>					
Location	Samples	Min Volume (L)	Sample Average (counts)	Average p/m <sup>3</sup>	Pass/Fail
Location 001	5	1602.734	0.6	0.4	Pass
Location 002	1	1602.734	0.0	0.0	Pass
Location 003	1	1602.734	0.0	0.0	Pass
Location 004	1	1602.734	2.0	1.2	Pass
Location 008	1	1602.734	132590.0	82727.4	Fail
Min Sample Volume Limit (L)					5.682
ISO Class 5 Limit					3520.0
Classification					Fail
<b>5.0 micron</b>					
Location	Samples	Min Volume (L)	Sample Average (counts)	Average p/m <sup>3</sup>	
Location 001	5	1602.734	0.0	0.0	
Location 002	1	1602.734	0.0	0.0	
Location 003	1	1602.734	0.0	0.0	
Location 004	1	1602.734	0.0	0.0	
Location 008	1	1602.734	184.0	114.8	
ISO M (29; 5.0 µm); LSAPC					
Unable to classify:					
- Selected standard and class does not support this particle size.					

**Figure 6-18 Sample ISO 14644-1 Report, 2015 Revision, Class 5 with M Descriptor enabled**

### British Standard 5295 Report

To display the BS-5295 report, follow these steps:

1. Click on the Home button and then Particle Standard Reports on the Home view's menu.
2. Click on New to create a new report.
3. On the Setup Particle Standard Report window, enter a name for the report, on the cleanroom tab select BS-5295.
4. Select which Class Level to report. The default for the British Standard report is G.
5. Enter the area of the cleanroom and select units of either ft<sup>2</sup> or m<sup>2</sup>.
6. Select air flow and status values.
7. Select which Locations and Channel Sizes you want to analyze.

The British Standard 5295 Report only addresses the following channel sizes: 0.3µ, 0.5µ, 5.0µ, 10.0µ and 25.0µ. All other channels are not supported by this standard. When building the report, select only select the channels that are pertinent to the instrument from which you will download data.

The number of locations required for a report to successfully run depends in part on the cleanroom area for which the report is being generated.

8. Select a data range Start and End date/time.
9. Click OK to build report.

<b>British Standard 5295</b>			
Targeted Class Level: K			
Created By: Administrator			
Created On: 6/13/2016 11:17:54			
5/2/2016 14:00:00 to 5/2/2016 14:50:00			
<b>Particle Counter(s) Used</b>			
ApexRS (01) (Serial #1402100007)			
<b>Cleanroom Information</b>			
Floor Area: 11.148 m <sup>2</sup>			
Air Flow: Unidirectional			
State: Unmanned			
Classification: Pass			
<b>Particle Size: 0.5 micron</b>			
Location	Samples	Min Volume (L)	Average p/m <sup>3</sup>
Location 001	5	1602.734	0.4
Location 002	1	1602.734	0.0
Location 003	1	1602.734	0.0
Location 004	1	1602.734	1.2
Mean			0.4
Maximum			1.2
Minimum			0.0
Standard Deviation			0.6
Class Limit			350000.0
Min Sample Volume Limit (L)			28.317
Classification			Pass
<b>Particle Size: 5.0 micron</b>			
Location	Samples	Min Volume (L)	Average p/m <sup>3</sup>
Location 001	5	1602.734	0.0
Location 002	1	1602.734	0.0
Location 003	1	1602.734	0.0
Location 004	1	1602.734	0.0
Mean			0.0
Maximum			0.0
Minimum			0.0
Standard Deviation			0.0
Class Limit			20000.0
Min Sample Volume Limit (L)			28.317
Classification			Pass

Figure 6-19 Sample British Standard 5295 Report

### EU GMP Annex 1 Report

To display a EU GMP Annex 1 report, follow these steps:

1. Click on the Home button and then Particle Standard Reports on the Home view's menu.
2. Click on New to create a new report.
3. On the Setup Particle Standard Report window, enter a name for the report, on the cleanroom tab select EU GMP Annex 1. Select the 2009 revision unless required to report based on the 2003 revision.
4. Select which Class Level to report. The default for the EU GMP Standard report is D.

When the Cleanroom State is "Operational", Class D is not defined. Class D is only applicable when the Cleanroom is "At Rest".

5. Enter the area of the cleanroom and select units of either ft<sup>2</sup> or m<sup>2</sup>.
6. Select air flow and status values.
7. Select which Locations and Channel Sizes you want to analyze. This standard accepts all particle sizes.

The EU GMP Annex 1 standard requires both 0.5 and 5.0 particle sizes. In the Particle Sizes list, only select these 2 channels. Other channel sizes are not supported by this standard.

EU GMP Annex 1 requires a minimum total sample volume of at least 1 m<sup>3</sup> for grades A and B.

**Note:** EU GMP Annex 1 2009 revises the current ISO 14644 – 1 (2015 revision) Table A.1 "Sampling Locations Related to Cleanroom Area".

The number of locations required for a report to successfully run depends in part on the cleanroom area that is being reported on.

8. Select a data range Start and End date/time.
9. Click OK to build report.

EU GMP Annex 1 (2009)			
Targeted Grade: C			
Created By: Administrator			
Created On: 6/13/2016 11:24:12			
5/2/2016 14:00:00 to 5/2/2016 14:50:00			
Particle Counter(s) Used			
ApexR5 (01) (Serial #1402100007)			
Cleanroom Information			
Floor Area: 5.000 m <sup>2</sup>			
Air Flow: Unidirectional			
State: Operational			
Classification: Pass			
Particle Size: 0.5 micron			
Location	Samples	Min Volume (L)	Average p/m <sup>3</sup>
Location 001	5	1602.734	0.4
Location 002	1	1602.734	0.0
Location 003	1	1602.734	0.0
Mean			0.1
Maximum			0.4
Minimum			0.0
Standard Deviation			0.2
Standard Error			0.1
95% UCL			0.5
Grade Limit			3520000.0
Min Sample Volume Limit (L)			2.000
Classification			Pass
Particle Size: 5.0 micron			
Location	Samples	Min Volume (L)	Average p/m <sup>3</sup>
Location 001	5	1602.734	0.0
Location 002	1	1602.734	0.0
Location 003	1	1602.734	0.0
Mean			0.0
Maximum			0.0
Minimum			0.0
Standard Deviation			0.0
Standard Error			0.0
95% UCL			0.0
Grade Limit			29000.0
Min Sample Volume Limit (L)			2.000
Classification			Pass

Figure 6-20 Sample EU GMP Annex 1 2009 Revision Report

### Printing Standard Report

When the Standard Report is viewed you can print it by clicking on the Print button on the toolbar.

1. Display the Standard Report.
2. Click the Print button.
3. On the default print window that appears, select a printer and click OK.

### Exporting Standard Reports

A Standard report can be saved to a Microsoft Excel or a comma separated file by following these steps,

1. Display the Standard Report.
2. Click on the Save As button.
3. On the Save As window that appears, select the file type to save to: Excel (\*.xls) or CSV (\*.csv).
4. Use the navigation tools at the top of the dialog box to select the directory into which to save the file.
5. Enter a name in the "File Name" field.
6. Click Save.

Once saved the report is saved to a Microsoft Excel or comma separated value file, the data can be formatted using the standard Microsoft Excel functions.

Please refer to the Microsoft Excel manual for further information.



# Chapter 7      Status and Alarms

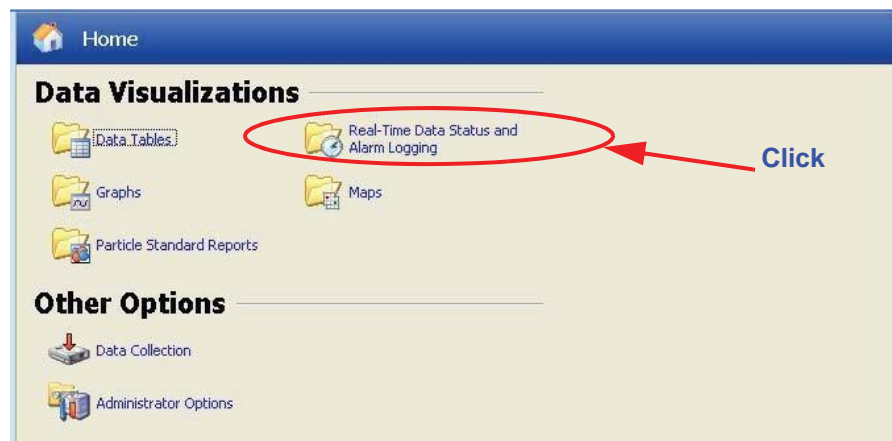
## Real Time Status

---

This chapter describes how LMS Express RT displays the status of all real time data and allows users to configure, view and acknowledge alarms and warnings.

To quickly see the status of the system, LMS Express RT users can check the real time location, instrument and/or data status windows.

To see the status windows, click the Home button and under the Data Visualization section of the Home view, click Real-Time Data Status and Alarm Logging.



**Figure 7-1 Real-Time Data Status & Alarm Logging**



Figure 7-2 Real Time Status Options

The following sections describe the available status windows.

For information on the alarm options listed on the Real Time Status Options menu, see the section on alarms later in this chapter.

### Real Time Data Status

The Real Time Data Status view displays the current or last known value for each dataset in the system. The user can see this data as a grid or a list of detailed rows.

### Real Time Data Status Grid

Clicking the Real Time Data Status option displays the following screen. Each known data set appears in this grid. If there are enabled alarm triggers, then data sets that have exceeded the alarm or warning limits are colored red or yellow respectively.

**Note:** The number of cells in the grid scales to the number of data sets in the system. The more data sets there are, the smaller the cells will be.

**Note:** The “Real Time Data Status” window shows Disabled status (dark grey) if data collection has stopped. If data collection has stopped due to an error, then that Data Set is shown in blue.



Real-Time Data Status					
View Mode: Grid					
HANDHELD 3016 (01) Packaging - 02 0.3 micron (Counts)	HANDHELD 3016 (01) Packaging - 02 0.3 micron (Normalized)	HANDHELD 3016 (01) Packaging - 02 0.5 micron (Counts)	HANDHELD 3016 (01) Packaging - 02 0.5 micron (Normalized)	HANDHELD 3016 (01) Packaging - 02 0.7 micron (Counts)	HANDHELD 3016 (01) Packaging - 02 0.7 micron (Normalized)
HANDHELD 3016 (01) Packaging - 02 1.0 micron (Counts)	HANDHELD 3016 (01) Packaging - 02 1.0 micron (Normalized)	HANDHELD 3016 (01) Packaging - 02 2.0 micron (Counts)	HANDHELD 3016 (01) Packaging - 02 2.0 micron (Normalized)	HANDHELD 3016 (01) Packaging - 02 5.0 micron (Counts)	HANDHELD 3016 (01) Packaging - 02 5.0 micron (Normalized)
HANDHELD 3016 (01) Packaging - 02 Analog 1 Temperature	HANDHELD 3016 (01) Packaging - 02 Analog 2 Relative Humidity	HANDHELD 3016 (01) Packaging - 02 Sample Time	HANDHELD 3016 (01) Packaging - 02 Sample Volume	HANDHELD 3016 (02) Packaging - 02 0.3 micron (Counts)	HANDHELD 3016 (02) Packaging - 02 0.3 micron (Normalized)
HANDHELD 3016 (02) Packaging - 02 0.5 micron (Counts)	HANDHELD 3016 (02) Packaging - 02 0.5 micron (Normalized)	HANDHELD 3016 (02) Packaging - 02 1.0 micron (Counts)	HANDHELD 3016 (02) Packaging - 02 1.0 micron (Normalized)	HANDHELD 3016 (02) Packaging - 02 10.0 micron (Counts)	HANDHELD 3016 (02) Packaging - 02 10.0 micron (Normalized)
HANDHELD 3016 (02) Packaging - 02 3.0 micron (Counts)	HANDHELD 3016 (02) Packaging - 02 3.0 micron (Normalized)	HANDHELD 3016 (02) Packaging - 02 5.0 micron (Counts)	HANDHELD 3016 (02) Packaging - 02 5.0 micron (Normalized)	HANDHELD 3016 (02) Packaging - 02 Analog 1 Temperature	HANDHELD 3016 (02) Packaging - 02 Analog 2 Relative Humidity

**Figure 7-3 Real Time Data Status Window - Grid**

**Note:** The “Real Time Data Status” window only shows data sets collected in real-time. It does not show data sets collected from download or data sets belonging to deleted real-time instruments.

The user can click on a cell and ‘expand’ it so that its text is enlarged for easier reading. Clicking on the expanded cell will shrink it back to its original size.



Real-Time Data Status					
View Mode: Grid					
HANDHELD 3016 (01) Packaging - 02 0.3 micron (Counts)	HANDHELD 3016 (01) Packaging - 02 0.3 micron (Normalized)	HANDHELD 3016 (01) Packaging - 02 0.5 micron (Counts)	HANDHELD 3016 (01) Packaging - 02 0.5 micron (Normalized)	HANDHELD 3016 (01) Packaging - 02 0.7 micron (Counts)	HANDHELD 3016 (01) Packaging - 02 0.7 micron (Normalized)
HANDHELD 3016 (01) Packaging - 02 1.0 micron (Counts)	HANDHELD 3016 (01) Packaging - 02 1.0 micron (Normalized)	HANDHELD 3016 (01) Packaging - 02 2.0 micron (Counts)	HANDHELD 3016 (01) Packaging - 02 2.0 micron (Normalized)	HANDHELD 3016 (01) Packaging - 02 5.0 micron (Counts)	HANDHELD 3016 (01) Packaging - 02 5.0 micron (Normalized)
<div style="text-align: center;"> <b>HANDHELD 3016 (01)</b>  <b>Packaging - 02</b>  <b>Analog 2</b>  <b>Relative Humidity</b> </div>					
HANDHELD 3016 (02) Packaging - 02 0.3 micron (Counts)	HANDHELD 3016 (02) Packaging - 02 0.3 micron (Normalized)	HANDHELD 3016 (02) Packaging - 02 1.0 micron (Counts)	HANDHELD 3016 (02) Packaging - 02 1.0 micron (Normalized)	HANDHELD 3016 (02) Packaging - 02 10.0 micron (Counts)	HANDHELD 3016 (02) Packaging - 02 10.0 micron (Normalized)
HANDHELD 3016 (02) Packaging - 02 3.0 micron (Counts)	HANDHELD 3016 (02) Packaging - 02 3.0 micron (Normalized)	HANDHELD 3016 (02) Packaging - 02 5.0 micron (Counts)	HANDHELD 3016 (02) Packaging - 02 5.0 micron (Normalized)	HANDHELD 3016 (02) Packaging - 02 Analog 1 Temperature	HANDHELD 3016 (02) Packaging - 02 Analog 2 Relative Humidity

**Figure 7-4 Real Time Data Status Window – Expanded**

Alternatively the user can select “Details” from the View Mode pull down field and display the data sets as detailed rows.

**Real-Time Data Status**

View Mode: Details

Name	Alarm Status	Value	Units	Date Time	Sampling Status
Apex23 (02):Location 001:0.3 micron (Counts)	Unknown		Counts	4/11/2018 16:26:42	Instrument timeout!
Apex23 (02):Location 001:0.3 micron (Normalized)	Unknown		p/ft <sup>3</sup>	4/11/2018 16:26:42	Instrument timeout!
Apex23 (02):Location 001:0.3 micron (Differential)	Unknown		Counts	4/11/2018 16:26:42	Instrument timeout!
Apex23 (02):Location 001:0.3 micron (IAQ)	Unknown		µg/m <sup>3</sup>	4/11/2018 16:26:42	Instrument timeout!
Apex23 (02):Location 001:0.3 micron (Summation)	Unknown		Counts	4/11/2018 16:26:42	Instrument timeout!
Apex23 (02):Location 001:0.5 micron (Counts)	Unknown		Counts	4/11/2018 16:26:42	Instrument timeout!
Apex23 (02):Location 001:0.5 micron (Normalized)	Unknown		p/ft <sup>3</sup>	4/11/2018 16:26:42	Instrument timeout!
Apex23 (02):Location 001:0.5 micron (Differential)	Unknown		Counts	4/11/2018 16:26:42	Instrument timeout!
Apex23 (02):Location 001:0.5 micron (IAQ)	Unknown		µg/m <sup>3</sup>	4/11/2018 16:26:42	Instrument timeout!
Apex23 (02):Location 001:0.5 micron (Summation)	Unknown		Counts	4/11/2018 16:26:42	Instrument timeout!
Apex23 (02):Location 001:1.0 micron (Counts)	Unknown		Counts	4/11/2018 16:26:42	Instrument timeout!
Apex23 (02):Location 001:1.0 micron (Normalized)	Unknown		p/ft <sup>3</sup>	4/11/2018 16:26:42	Instrument timeout!
Apex23 (02):Location 001:1.0 micron	Unknown		Counts	4/11/2018 16:26:42	Instrument timeout!

**Note:** Click on a column heading to sort the Data Status window by that particular column.

Figure 7-5 Real Time Data Status Window – Details

**Note:** See the section on alarms, later in this chapter for more information about alarms.

### Real Time Alarm Group Status

Clicking the Real Time Alarm Group status option displays the following screen. The screen shows all data sets belonging to all Alarm Groups configured in the system. All data sets that are not assigned to alarm groups are hidden.

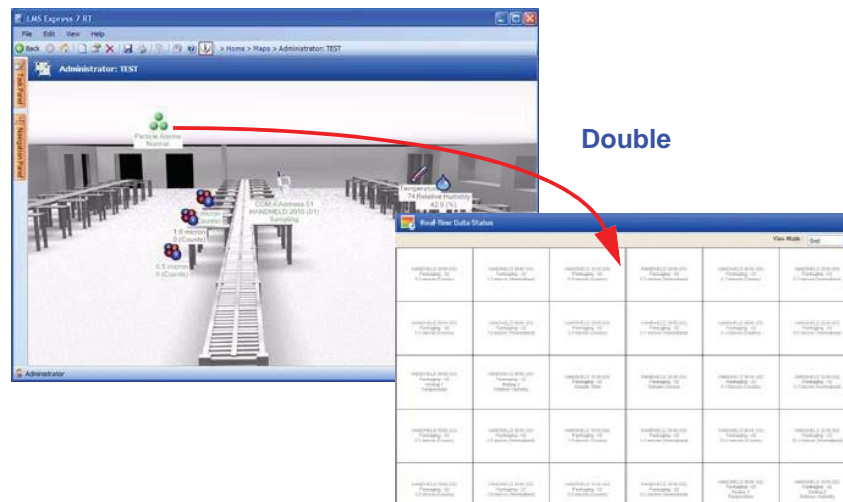


Figure 7-6 Real Time Alarm Group Status Window

## Alarms Displayed

If there are enabled alarm or warning triggers, data sets that have exceeded the enabled alarm or warning conditions are colored red or yellow, respectively. Data sets will be colored gray if data collection has stopped. Data sets reporting data collection errors will be colored blue.

## Task Panel Options

The Task Panel on the Real Time Data Status window allows the user to setup alarms and warnings (if they are an administrator), view the alarm log, and filter the view.

Users can use the View Filters available on the Task Panel to limit the number of data sets displayed. Four filters are available to limit which data sets are displayed - Alarm Group Location, Instrument, or Data Type. To use the filters, select a value (or "<ALL>") from the pull down list for one or more of the listed filters.

For example, selecting "Location 001", "HANDHELD 3016 (01)" and "Particle (Counts)" from the Location, Instrument and Data Type filters, respectively, limit the data sets displayed on the Data Status window to particle counts downloaded from this Handheld recorded at Location 001.

## Alarms

Besides collecting and displaying data Real Time, LMS Express RT allows users to configure alarms and warnings; view the current alarm status of each location, instrument and data set; and acknowledge alarms and warnings.

This section describes how LMS Express RT display and allow configuration and acknowledgement of alarms and warnings.

When LMS Express RT is configured to collect data Real Time from instruments, LMS Express RT will compare data collected against any set limits to alert users when alarm or warning conditions occur.

The alarms and warnings that occur are logged in an alarm log. Users can acknowledge alarms and warnings on the alarm log view, or view and acknowledge alarms only on the additional Unacknowledged Alarms Log.

All users can view alarms and warnings. Only power users and administrators can acknowledge alarms and warnings. Only



administrators are allowed to configure alarm and warning limits.

### Adding and Modifying Alarm Triggers

Alarm and warning conditions are setup via alarm triggers.

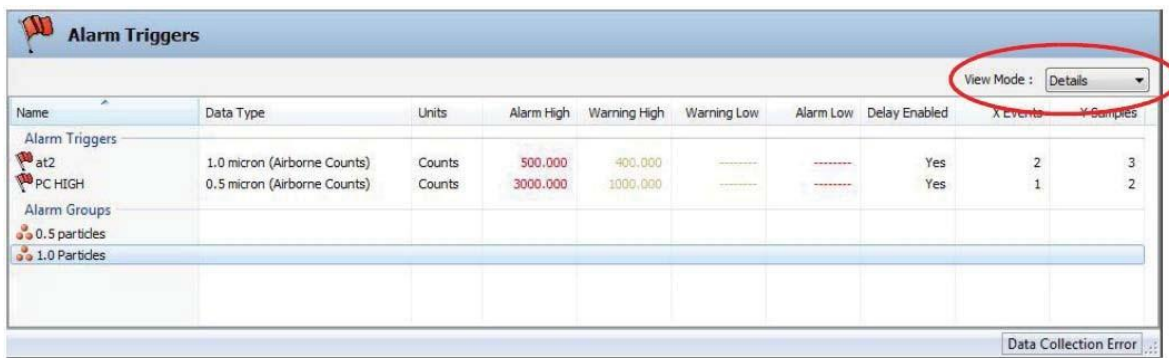
**Note:** In LMS Express RT only administrator users can configure alarm triggers.

Alarms can be configured to report on particular data set types (like particle counts, temperature, relative humidity), all or particular locations.

Multiple alarm triggers can be applied to the same data set. For example if an administrator has setup an alarm trigger for all particle values at all locations, the administrator can also configure an alarm trigger for a particle alarm for a specific channel size or location. When LMS Express RT receives new data and evaluates enabled alarm triggers against it, each data set is assigned the worst status of all triggers associated with the data set.

To setup alarms and warning triggers, log into LMS Express RT as an administrator. Click the Home button, on the Home menu, click Administrator Options and then click on Setup Alarms and Warnings.

The following Alarm Triggers view appears. This view displays all existing alarms triggers.



Name	Data Type	Units	Alarm High	Warning High	Warning Low	Alarm Low	Delay Enabled	X Events	Y Samples
<b>Alarm Triggers</b>									
at2	1.0 micron (Airborne Counts)	Counts	500,000	400,000	-----	-----	Yes	2	3
PC HIGH	0.5 micron (Airborne Counts)	Counts	3000,000	1000,000	-----	-----	Yes	1	2
<b>Alarm Groups</b>									
0.5 particles									
1.0 Particles									

**Figure 7-7 Alarm Triggers - Detail Mode**

By default the Alarm Triggers view appears in detail mode. To see alarm triggers displayed as icons, select Icons from the View Mode field.

## Alarm Trigger Task Panel

Using the Task Panel on the Alarm Triggers window, users can add, update, or delete alarm triggers and alarm groups, as well as enable or disable alarm acknowledgements, system wide.



Figure 7-8 Alarm Trigger Task Panel

## Creating a New Alarm Trigger

To create an alarm trigger, click “Create a New Configuration” on the task panel, right click anywhere on the Alarm Triggers view and select Add, or click the New button on the Toolbar. The following window displays.

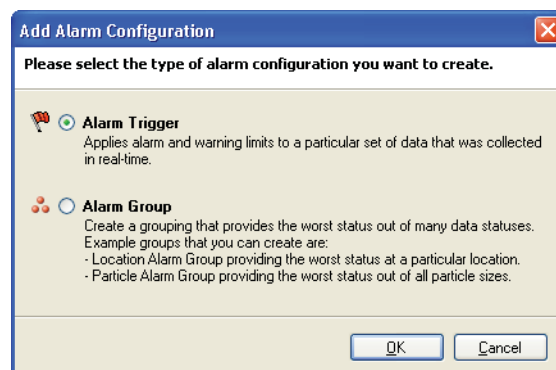
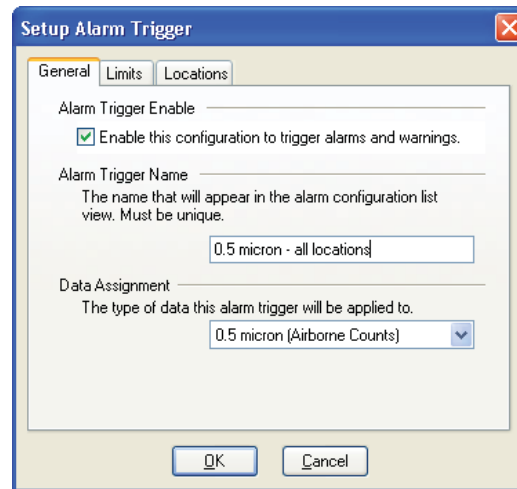


Figure 7-9 Add Alarm Configuration window

Select Alarm Trigger and click Ok. The following Setup Alarm Trigger window displays.



The image shows the 'Setup Alarm Trigger' dialog box with the 'General' tab selected. It contains the following fields:

- Alarm Trigger Enable:** A checked checkbox with the label 'Enable this configuration to trigger alarms and warnings.'
- Alarm Trigger Name:** A text box containing '0.5 micron - all locations'. Below it is a note: 'The name that will appear in the alarm configuration list view. Must be unique.'
- Data Assignment:** A dropdown menu showing '0.5 micron (Airborne Counts)'. Below it is a note: 'The type of data this alarm trigger will be applied to.'

At the bottom are 'OK' and 'Cancel' buttons.

**Figure 7-10 Setup Alarm Trigger - General Information**

To create an alarm trigger, select or enter the following information.

- Check Enable to enable the trigger. To disable a trigger, but still keep its configuration, un-check this box.
- Enter a name for the Alarm trigger.
- Select the type of data the trigger applies to.

Next, to enter the alarm and warning limits, click the Limits tab to display the window shown in Figure 7-11.



The image shows the 'Setup Alarm Trigger' dialog box with the 'Limits' tab selected. It contains the following fields:

- Limit Units:** A dropdown menu showing 'Counts'. Above it is a note: 'The units of the below limits. It does not have to match the data's units.'
- Alarm and Warning Limits:** Four rows of checkboxes and text boxes:
  - ☐ Alarm High : 0.000 (with a red indicator box)
  - ☐ Warning High : 0.000 (with a yellow indicator box)
  - ☐ Warning Low : 0.000 (with a yellow indicator box)
  - ☐ Alarm Low : 0.000 (with a red indicator box)
- Alarm Delay:**
  - ☐ Enabled
  - Below it is a note: 'This alarm will not trigger until X Events are found in a rolling window of Y samples.'
  - X Events : [text box]
  - Y Samples : [text box]

At the bottom are 'OK' and 'Cancel' buttons.

**Figure 7-11 Setup Alarm Trigger - Limit Information**



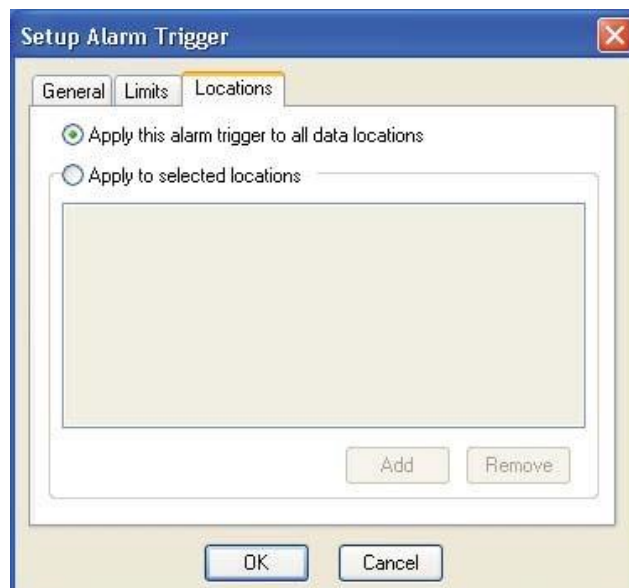
At this screen, the user selects the units for the alarm and sets up alarm and warning limits for the trigger.

- Select a unit of measure for the trigger from the pull down list.
- Four alarm limits are available - Alarm High, Warning High, Warning Low and Alarm Low. To configure an alarm limit, check the box next to the desired alarm limit and then enter the value in the limit field.

If the alarm trigger applies to only one, or a set of locations, click the Location's tab (Figure 7-12).

- Alarm Delay - Alarm delay has three settings and they are the Enabled check box, X Events as threshold, and Y Samples to monitor as a window.

To configure a delay, check the "Enabled" box and enter the values for X Events and Y Samples.



**Figure 7-12 Setup Alarm Trigger - Location Information**

**Note:** The Location list's sort order can be changed by clicking the column headers.

Alarm Triggers can apply to one location, a set of locations or all locations. By default, a trigger applies to all locations (Figure 7-12). Users can assign the trigger to apply to one or more specific location(s) by choosing the “Apply to selected locations” (Figure 7-13). Click the Add button to display the Select Locations window. Choose the location(s) and click OK to complete.

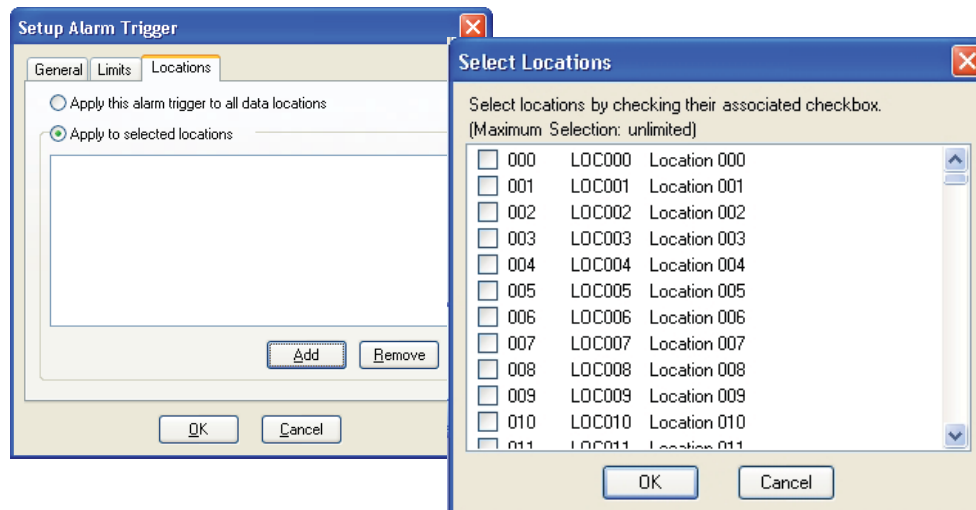


Figure 7-13 Select Locations

The Locations window will update and display the selected locations.

When finished, click OK to save the information.

If the new alarm trigger is enabled, its alarm limits take effect on the next data cycle. Multiple alarm triggers can be applied to the same data set. For each data set LMS Express RT reports and records the worst status of all alarm triggers that apply to the given data set.

### Modifying an Alarm Trigger

Modify an alarm trigger by selecting it in the Alarm Triggers view and double clicking on it; select it and right click to pick Setup; or select it and click on the Setup button on the toolbar. Alternatively highlight it on the Alarm Triggers view and then click “Modify Alarm Trigger”.

The Setup Alarm Trigger window displays, displaying the trigger’s configuration information.

After the user has made changes and clicked OK to accept the changes, the Real Time Locations, Instruments and Data Status windows updates to reflect the changes the next time data is collected for each data set.

**Note:** There may be a delay after a trigger is modified and the Real Time data status windows update to reflect the changes.

## Deleting an Alarm Trigger

Delete an alarm trigger by selecting it and then clicking “Delete Alarm Trigger” on the Task Panel, the delete button on the toolbar, or right click and select Delete. The trigger is deleted from the list and the status windows updates to reflect the change.

When the users deletes an alarm, the previous data that was in an alarm and all alarm and warning acknowledgements remain in the database.

## Alarm Groups

Alarm Groups allows users to see the worst status of all data sets assigned to a group of data sets. Users can tie alarm groups to an instrument’s relays to display the status of a particular area. Alarm groups can also be used to display the status of a group of data sets on Maps and on the Real-Time Alarm Group Status window so that these windows will only display information on data sets the user is most interested in.

Data sets can be assigned to an Alarm Group by location and/or data type. For example, alarm groups could contain:

**Note:** It is okay to assign the same data set to multiple alarm groups.

- All data sets in a particular location. This alarm group will display the worst status of all data collected from that particular locations in the facility.
- All particle data sets in the system. This alarm group will display the worst status of all particle data collected on the system.

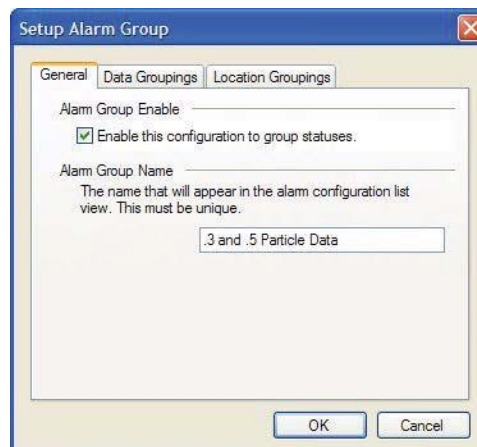
## Creating a New Alarm Group

To create an alarm group, click “Create a New Configuration” on the task panel, right-click anywhere on the Alarm Triggers view and select Add or click the New button on the Toolbar (Figure 7-14).



**Figure 7-14 Add Alarm Configuration window**

Select Alarm Group and click OK. The following Setup Alarm Group window displays.

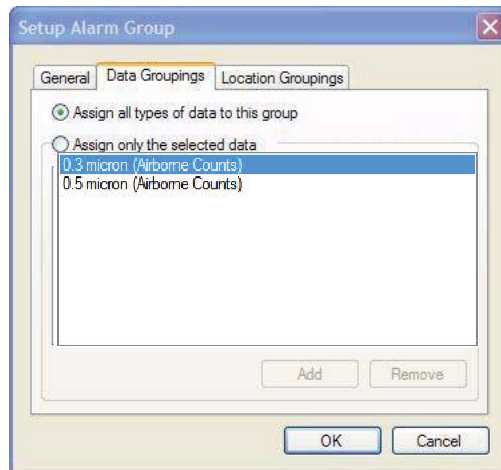


**Figure 7-15 Setup Alarm Group window**

To create an alarm group, select or enter the following information.

- Check Enable to enable the alarm group. To disable an alarm group, but still keep its configuration, un-check this box.
- Enter a name for the alarm group.

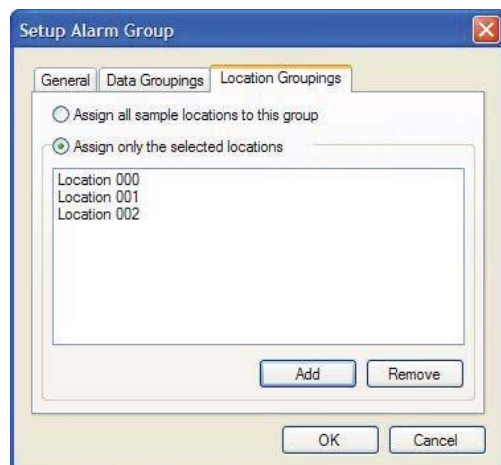
If the alarm group applies to only one, or a specific list of data types, click the Data Groupings tab to display the following window.



**Figure 7-16 Setup Alarm Group - Data Groupings**

All data types in all locations in the system will be assigned to the alarm group by default on the Data Grouping's tab. Select one or more specific data types by selecting "Assign only the selected data" then click Add. Pick the specific data types you want to add to the alarm group.

If the alarm group applies to only one location, or a set of locations, click the Location Grouping tab (Figure 7-17).



**Figure 7-17 Setup Alarm Group, Location Grouping**

Alarm Groups can apply to one location, a set of locations, or all

locations. Users can assign specific locations to an alarm group. To do so, click the Add button to display the Select Locations window.

**Note:** Alternatively, double click on the desired alarm group to modify it.

After selecting the locations for the alarm group, click OK to close the Setup Alarm Group window.

### Modifying an Alarm Group

To modify an alarm group, select an alarm group and either click “Change Selection’s Settings” on the task panel, click the Setup button on the Toolbar, or right click and select Setup from the menu that pops up. The Alarm Group Setup window described above displays.

Once all modifications have been made, click OK to close the Alarm Group Setup window.

### Deleting an Alarm Group

To delete an alarm group, select an alarm group and click “Delete the Selection” on the task panel, right click and select Delete from the pop up menu, or click Delete on the Toolbar.

Deleting an alarm group will automatically remove the alarm group from maps and relays used in real time data collection.

**Note:** When a user deletes an alarm group, the data sets & data remain in the database.

## Alarms and Warnings Log

LMS Express RT provides an Alarm Log so users can view alarms, warnings and acknowledgements.

Alarm triggers apply to both Real Time data and manually downloaded data. LMS Express RT tracks normal, warning and alarm transitions - that is, when a data set goes from normal to warning or alarm, an alarm log record is generated. When a data set returns to warning from alarm, or returns to normal from either warning or alarm, the change is also logged in the alarm log.

To view the log, click the Home button, then the “Real-Time Data Status and Alarm Logging” button and then the Alarms and Warnings Log button (Figure 7-18).

**Note:** Deleting data in the Database view deletes their associated alarm log entries.

ID	Date Time	From Status	To Status	Data Set	Message
1	6/16/2005 16:07:59	None	Alarm	HANDHELD 3016 (01)Location 000:0.3 micron (Counts)	12448 Counts exceeded Alarm High limit 70 Cou
2	6/16/2005 16:07:59	None	Alarm	HANDHELD 3016 (01)Location 000:Analog 1:Temperature	76.2 F exceeded Alarm High limit 76 F.
3	6/16/2005 16:07:59	None	Warning	HANDHELD 3016 (01)Location 000:Analog 2:Relative Humidity	40.5 % exceeded Warning High limit 39 %
4	6/16/2005 16:16:32	None	Alarm	HANDHELD 3016 (01)Location 001:0.3 micron (Counts)	12557 Counts exceeded Alarm High limit 70 Cou
5	6/16/2005 16:16:32	None	Alarm	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	76.2 F exceeded Alarm High limit 76 F.
6	6/16/2005 16:16:32	None	Warning	HANDHELD 3016 (01)Location 001:Analog 2:Relative Humidity	40.2 % exceeded Warning High limit 39 %
7	6/16/2005 16:23:32	Alarm	Warning	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	75.7 F exceeded Warning High limit 75 F.
8	6/16/2005 16:33:02	Warning	Alarm	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	76.2 F exceeded Alarm High limit 76 F.
9	6/16/2005 16:58:32	Alarm	Warning	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	75.7 F exceeded Warning High limit 75 F.
10	6/17/2005 10:00:23	None	Alarm	HANDHELD 3016 (01)Location 001:0.3 micron (Counts)	11889 Counts exceeded Alarm High limit 70 Cou
11	6/17/2005 10:00:23	None	Normal	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	Returned to Normal.
12	6/17/2005 10:00:23	None	Alarm	HANDHELD 3016 (01)Location 001:Analog 2:Relative Humidity	42.9 % exceeded Alarm High limit 41 %
13	6/17/2005 10:37:14	Normal	Warning	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	75.2 F exceeded Warning High limit 75 F.
14	6/17/2005 10:37:44	Warning	Normal	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	Returned to Normal.
15	6/17/2005 10:39:14	Normal	Warning	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	75.2 F exceeded Warning High limit 75 F.
16	6/17/2005 10:39:44	Warning	Normal	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	Returned to Normal.
17	6/17/2005 10:45:14	Normal	Warning	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	75.2 F exceeded Warning High limit 75 F.
18	6/17/2005 10:45:44	Warning	Normal	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	Returned to Normal.
19	6/17/2005 10:46:14	Normal	Warning	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	75.2 F exceeded Warning High limit 75 F.
20	6/17/2005 11:12:14	Warning	Alarm	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	76.2 F exceeded Alarm High limit 76 F.
21	6/17/2005 11:13:14	Alarm	Warning	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	75.7 F exceeded Warning High limit 75 F.
22	6/17/2005 11:22:14	Warning	Alarm	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	76.2 F exceeded Alarm High limit 76 F.
23	6/17/2005 11:26:44	Alarm	Warning	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	75.7 F exceeded Warning High limit 75 F.
24	6/17/2005 11:27:14	Warning	Alarm	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	76.2 F exceeded Alarm High limit 76 F.
25	6/17/2005 11:28:44	Alarm	Warning	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	75.7 F exceeded Warning High limit 75 F.
26	6/17/2005 11:29:14	Warning	Alarm	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	76.2 F exceeded Alarm High limit 76 F.

Figure 7-18 Alarms and Warnings Log

Each log record contains the date and time of the alarm, the alarm or warning transition (normal to warning, normal to alarm, alarm to normal, etc.), the name of the data set, a message and (if a note is added) a note about the data or alarm acknowledgement.

## Task Panel

When the Alarms and Warnings Log view is displayed, the following options are available on the Task Panel.

## Set up Alarms and Warnings

To quickly switch to the Alarm Triggers view, click the “Setup Alarms and Warnings” item on the Task Panel.

## Change Log's Time Period

By default the last 7 days of alarm and warning log entries are displayed on the Alarms and Warnings Log View. To display a different range of alarm and warning log records, click "Change Log's Time Period" on the Alarms and Warnings Log Task Panel or select the Setup button on the toolbar (Figure 7-19).



**Figure 7-19 Setup Alarm Log window**

On the Setup Alarm Log window the user can select the range of alarm and warning records that are displayed in two ways.

- Select "Rolling time range" and enter a specific duration.
- Select a Fixed time range, entering a specific start date and time and end date and time.

Clicking OK updates the Alarms and Warnings View to display only those records that fall in the selected time range.

## Save Alarm Log to File

To save the currently displayed alarm log to a file, select "Save to File" from the Task Panel or click the "Save As" button on the toolbar.

On the "Save As" window that appears, select a folder and filename to save the log to and what type of file to create Excel (.xls) or CSV (\*.csv). Clicking OK saves the log to the selected filename.



## Unacknowledged Alarms

To quickly see all the currently unacknowledged alarms, click the “Unacknowledged Alarms” item on the Task Panel. A list of all unacknowledged alarms displays.

Alarms can be acknowledged from the Unacknowledged Alarms view. See the section on Acknowledging alarms later in this chapter.

## Print Log

To print the currently displayed log entries, select Print Log from the Task Panel or click the print toolbar button. On the Print setup window that appears, select the printer to print to and click OK.

## Acknowledge Selection

LMS Express RT allows users to acknowledge alarms and add notes to alarm and warning log records.

To add a note or acknowledgement to an alarm log row, select the row and double click on it. See the section on acknowledging alarms later in this chapter for more details.

## Viewing Alarm Status

LMS Express RT provides several ways to view alarm, warning and normal status.

## Status Window

When alarm or warning limits are exceeded for enabled alarm triggers, the results appear on the Data Status view.

**Note:** Data sets that do not have enabled alarm triggers and are collecting data are displayed in white with a status of “None”.

## Data Status View - Alarms

If an administrator has set up and enabled alarm triggers, the Real Time Data Status view shows the last known alarm status for each data set along with its value.

**Note:** The “Real-Time View” window shows Disabled status (darkgrey) if data collection has stopped. If data collection has stopped due to a Data Collection error, then that data set is shown in blue.

Data sets that have exceeded alarm limits are highlighted red, data sets that have exceeded warning limits are highlighted yellow and normal values are colored green. A status of “None” is assigned to data sets that are not affected by one or more alarm triggers.

The screenshot shows a window titled "Real-Time Data Status" with a "View Mode" dropdown set to "Grid". The grid contains 24 data points arranged in 6 rows and 4 columns. Each cell displays a data point name, its packaging, and its current status. The status colors indicate alarm levels: Red for Alarm, Yellow for Warning, Green for Normal, and Blue for Disabled/Stopped.

Row	Col 1	Col 2	Col 3	Col 4
1	HANDHELD 3016 (01) Packaging - 02 0.5 micron (Counts)	HANDHELD 3016 (01) Packaging - 02 0.5 micron (Normalised)	HANDHELD 3016 (01) Packaging - 02 0.5 micron (Counts)	HANDHELD 3016 (01) Packaging - 02 0.5 micron (Normalised)
2	HANDHELD 3016 (01) Packaging - 02 1.0 micron (Counts)	HANDHELD 3016 (01) Packaging - 02 1.0 micron (Normalised)	HANDHELD 3016 (01) Packaging - 02 2.0 micron (Counts)	HANDHELD 3016 (01) Packaging - 02 2.0 micron (Normalised)
3	HANDHELD 3016 (01) Packaging - 02 Ambig 1 Temperature	HANDHELD 3016 (01) Packaging - 02 Ambig 2 Relative Humidity	HANDHELD 3016 (01) Packaging - 02 Sample Time	HANDHELD 3016 (01) Packaging - 02 Sample Volume
4	HANDHELD 3016 (02) Packaging - 02 0.5 micron (Counts)	HANDHELD 3016 (02) Packaging - 02 0.5 micron (Normalised)	HANDHELD 3016 (02) Packaging - 02 1.0 micron (Counts)	HANDHELD 3016 (02) Packaging - 02 1.0 micron (Normalised)
5	HANDHELD 3016 (02) Packaging - 02 3.0 micron (Counts)	HANDHELD 3016 (02) Packaging - 02 3.0 micron (Normalised)	HANDHELD 3016 (02) Packaging - 02 5.0 micron (Counts)	HANDHELD 3016 (02) Packaging - 02 5.0 micron (Normalised)
6	HANDHELD 3016 (02) Packaging - 02 Sample Time	HANDHELD 3016 (02) Packaging - 02 Sample Volume	REMOTE 3016P (01) Packaging - 02 0.5 micron (Counts)	REMOTE 3016P (01) Packaging - 02 0.5 micron (Normalised)
7	REMOTE 3016P (01) Packaging - 02 1.0 micron (Counts)	REMOTE 3016P (01) Packaging - 02 1.0 micron (Normalised)	REMOTE 3016P (01) Packaging - 02 2.0 micron (Counts)	REMOTE 3016P (01) Packaging - 02 2.0 micron (Normalised)
8	REMOTE 3016P (01) Packaging - 02 3.0 micron (Counts)	REMOTE 3016P (01) Packaging - 02 3.0 micron (Normalised)	REMOTE 3016P (01) Packaging - 02 5.0 micron (Counts)	REMOTE 3016P (01) Packaging - 02 5.0 micron (Normalised)
9	REMOTE 3016P (01) Packaging - 02 Sample Time	REMOTE 3016P (01) Packaging - 02 Sample Volume	REMOTE 3016P (01) Packaging - 02 Ambig 1 Temperature	REMOTE 3016P (01) Packaging - 02 Ambig 2 Relative Humidity

Figure 7-20 Data Status view - Status of Enabled Alarm Triggers

## Status Bar – Alarm Status

Besides viewing the Data Status view, to give users a quick, overall summary of all alarm triggers, LMS Express RT displays the overall system alarm status in the lower right corner of the application window.

The status displayed is the aggregate of all currently enabled triggers.

- If all enabled triggers are reporting normal, a green “Normal” displays in the lower right portion of the status bar.
- If one or more enabled triggers report that a warning limit has been exceeded, but no alarm limits have been exceeded in the system, then a yellow “Warning” appears in the lower right portion of the status bar.
- If one or more triggers report that an alarm limit has been exceeded, then a red, flashing “Alarm” appears in the lower right corner of the application’s status bar.

**Note:** Fault takes priority over all other statuses (Alarm, Warning or Normal) and appears cyan (Blue).

- If one or more instrument reports a fault condition, “Fault” will appear and flash on and off in the lower right portion of the status bar. Instruments can be both in fault and alarm, warning, or normal. If such is the case, the status bar will report and alternatively flash “Alarm/Fault” or “Warning/Fault” or “Normal/Fault” respectively.
- If one or more instruments receives errors while collecting data, “Data Collection Error” will appear and flash on and off in the lower right portion of the status bar. Instruments can be both in data collection error and alarm, warning, or normal. In such a case, the status bar will alternatively flash “Data Collection Error”/”Alarm”, or “Data Collection Error”/”Warning” or “Data Collection Error”/”Normal.” respectively.



**Figure 7-21 Normal, Warning and Alarms Reported on Status Bar**

- When there are unacknowledged alarms, the words “Unacknowledged Alarms Exist” will flash in the lower right corner of the application’s status bar. This text will disappear when all alarm entries have been acknowledged. Clicking on this text will display the Unacknowledged Alarms view.



**Figure 7-22 Unacknowledged Alarms Reported on Status Bar**

## Alarm Status Bar Navigation

Besides displaying the current overall system status, the Alarm Status section of the Status Bar gives the user a quick way to switch views.

- Clicking on the Alarm Status of the status bar displays the “Real-Time Data Status and Alarm Logging” view.
- Clicking the Unacknowledged Alarms Exist section of the status bar displays the “Unacknowledged Alarms” view.

## Acknowledging Alarms

Besides displaying alarm and warning conditions, LMS Express RT allows users to acknowledge alarm and warning log records.

There are two views on which users can acknowledge alarms and/or warnings - the Alarms and Warning Log view and the Unacknowledged Alarms view.

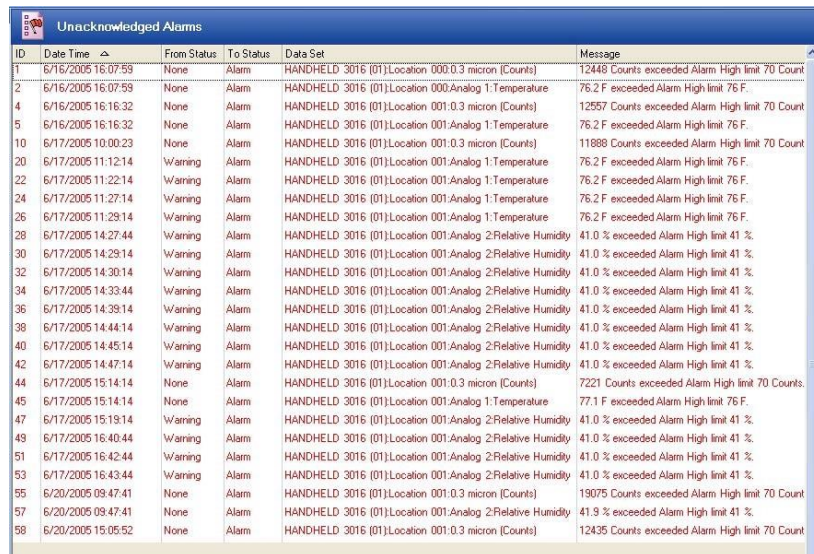
To display the Alarms and Warnings Log view, click on the Home button, then click on Real-Time Data Status and Alarm Logging and then click Alarms and Warnings Log.



ID	Date Time	From Status	To Status	Data Set	Message
1	6/16/2005 16:07:59	None	Alarm	HANDHELD 3016 (01)Location 000.0.3 micron (Counts)	12448 Counts: exceeded Alarm High limit 70 Cou
2	6/16/2005 16:07:59	None	Alarm	HANDHELD 3016 (01)Location 000 Analog 1.Temperature	76.2 F: exceeded Alarm High limit 76 F.
3	6/16/2005 16:07:59	None	Warning	HANDHELD 3016 (01)Location 000 Analog 2.Relative Humidity	40.5 %: exceeded Warning High limit 38 %.
4	6/16/2005 16:16:32	None	Alarm	HANDHELD 3016 (01)Location 001.0.3 micron (Counts)	12957 Counts: exceeded Alarm High limit 70 Cou
5	6/16/2005 16:16:32	None	Alarm	HANDHELD 3016 (01)Location 001 Analog 1.Temperature	76.2 F: exceeded Alarm High limit 76 F.
6	6/16/2005 16:16:32	None	Warning	HANDHELD 3016 (01)Location 001 Analog 2.Relative Humidity	40.2 %: exceeded Warning High limit 38 %.
7	6/16/2005 16:23:32	Alarm	Warning	HANDHELD 3016 (01)Location 001 Analog 1.Temperature	75.7 F: exceeded Warning High limit 75 F.
8	6/16/2005 16:33:02	Warning	Alarm	HANDHELD 3016 (01)Location 001 Analog 1.Temperature	76.2 F: exceeded Alarm High limit 76 F.
9	6/16/2005 16:58:32	Alarm	Warning	HANDHELD 3016 (01)Location 001 Analog 1.Temperature	75.7 F: exceeded Warning High limit 75 F.
10	6/17/2005 10:00:23	None	Alarm	HANDHELD 3016 (01)Location 001.0.3 micron (Counts)	11888 Counts: exceeded Alarm High limit 70 Cou
11	6/17/2005 10:00:23	None	Normal	HANDHELD 3016 (01)Location 001 Analog 1.Temperature	Returned to Normal.
12	6/17/2005 10:00:23	None	Alarm	HANDHELD 3016 (01)Location 001 Analog 2.Relative Humidity	42.9 %: exceeded Alarm High limit 41 %.
13	6/17/2005 10:37:14	Normal	Warning	HANDHELD 3016 (01)Location 001 Analog 1.Temperature	75.2 F: exceeded Warning High limit 75 F.
14	6/17/2005 10:37:44	Warning	Normal	HANDHELD 3016 (01)Location 001 Analog 1.Temperature	Returned to Normal.
15	6/17/2005 10:39:14	Normal	Warning	HANDHELD 3016 (01)Location 001 Analog 1.Temperature	75.2 F: exceeded Warning High limit 75 F.
16	6/17/2005 10:39:44	Warning	Normal	HANDHELD 3016 (01)Location 001 Analog 1.Temperature	Returned to Normal.
17	6/17/2005 10:45:14	Normal	Warning	HANDHELD 3016 (01)Location 001 Analog 1.Temperature	75.2 F: exceeded Warning High limit 75 F.
18	6/17/2005 10:45:44	Warning	Normal	HANDHELD 3016 (01)Location 001 Analog 1.Temperature	Returned to Normal.
19	6/17/2005 10:46:14	Normal	Warning	HANDHELD 3016 (01)Location 001 Analog 1.Temperature	75.2 F: exceeded Warning High limit 75 F.
20	6/17/2005 11:12:14	Warning	Alarm	HANDHELD 3016 (01)Location 001 Analog 1.Temperature	76.2 F: exceeded Alarm High limit 76 F.

Figure 7-23 Alarms and Warnings Log

To display the Unacknowledged Alarms view, click on the Home button, then click on Real Time Location, Instrument and Data Status and then click Unacknowledged Alarms (refer to Figure 7-24).



ID	Date Time	From Status	To Status	Data Set	Message
1	6/16/2005 16:07:59	None	Alarm	HANDHELD 3016 (01)Location 000:0.3 micron (Counts)	12448 Counts exceeded Alarm High limit 70 Count
2	6/16/2005 16:07:59	None	Alarm	HANDHELD 3016 (01)Location 000:Analog 1:Temperature	76.2 F exceeded Alarm High limit 76 F.
4	6/16/2005 16:16:32	None	Alarm	HANDHELD 3016 (01)Location 001:0.3 micron (Counts)	12557 Counts exceeded Alarm High limit 70 Count
5	6/16/2005 16:16:32	None	Alarm	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	76.2 F exceeded Alarm High limit 76 F.
10	6/17/2005 10:00:23	None	Alarm	HANDHELD 3016 (01)Location 001:0.3 micron (Counts)	11888 Counts exceeded Alarm High limit 70 Count
20	6/17/2005 11:12:14	Warning	Alarm	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	76.2 F exceeded Alarm High limit 76 F.
22	6/17/2005 11:22:14	Warning	Alarm	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	76.2 F exceeded Alarm High limit 76 F.
24	6/17/2005 11:27:14	Warning	Alarm	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	76.2 F exceeded Alarm High limit 76 F.
26	6/17/2005 11:29:14	Warning	Alarm	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	76.2 F exceeded Alarm High limit 76 F.
28	6/17/2005 14:27:44	Warning	Alarm	HANDHELD 3016 (01)Location 001:Analog 2:Relative Humidity	41.0 % exceeded Alarm High limit 41 %
30	6/17/2005 14:29:14	Warning	Alarm	HANDHELD 3016 (01)Location 001:Analog 2:Relative Humidity	41.0 % exceeded Alarm High limit 41 %
32	6/17/2005 14:30:14	Warning	Alarm	HANDHELD 3016 (01)Location 001:Analog 2:Relative Humidity	41.0 % exceeded Alarm High limit 41 %
34	6/17/2005 14:33:44	Warning	Alarm	HANDHELD 3016 (01)Location 001:Analog 2:Relative Humidity	41.0 % exceeded Alarm High limit 41 %
36	6/17/2005 14:39:14	Warning	Alarm	HANDHELD 3016 (01)Location 001:Analog 2:Relative Humidity	41.0 % exceeded Alarm High limit 41 %
38	6/17/2005 14:44:14	Warning	Alarm	HANDHELD 3016 (01)Location 001:Analog 2:Relative Humidity	41.0 % exceeded Alarm High limit 41 %
40	6/17/2005 14:45:14	Warning	Alarm	HANDHELD 3016 (01)Location 001:Analog 2:Relative Humidity	41.0 % exceeded Alarm High limit 41 %
42	6/17/2005 14:47:14	Warning	Alarm	HANDHELD 3016 (01)Location 001:Analog 2:Relative Humidity	41.0 % exceeded Alarm High limit 41 %
44	6/17/2005 15:14:14	None	Alarm	HANDHELD 3016 (01)Location 001:0.3 micron (Counts)	7221 Counts exceeded Alarm High limit 70 Counts.
45	6/17/2005 15:14:14	None	Alarm	HANDHELD 3016 (01)Location 001:Analog 1:Temperature	77.1 F exceeded Alarm High limit 76 F.
47	6/17/2005 15:19:14	Warning	Alarm	HANDHELD 3016 (01)Location 001:Analog 2:Relative Humidity	41.0 % exceeded Alarm High limit 41 %
49	6/17/2005 16:40:44	Warning	Alarm	HANDHELD 3016 (01)Location 001:Analog 2:Relative Humidity	41.0 % exceeded Alarm High limit 41 %
51	6/17/2005 16:42:44	Warning	Alarm	HANDHELD 3016 (01)Location 001:Analog 2:Relative Humidity	41.0 % exceeded Alarm High limit 41 %
53	6/17/2005 16:43:44	Warning	Alarm	HANDHELD 3016 (01)Location 001:Analog 2:Relative Humidity	41.0 % exceeded Alarm High limit 41 %
55	6/20/2005 09:47:41	None	Alarm	HANDHELD 3016 (01)Location 001:0.3 micron (Counts)	19075 Counts exceeded Alarm High limit 70 Count
57	6/20/2005 09:47:41	None	Alarm	HANDHELD 3016 (01)Location 001:Analog 2:Relative Humidity	41.9 % exceeded Alarm High limit 41 %
58	6/20/2005 15:05:52	None	Alarm	HANDHELD 3016 (01)Location 001:0.3 micron (Counts)	12435 Counts exceeded Alarm High limit 70 Count

Figure 7-24 Unacknowledged Alarms view

To acknowledge an alarm on either the Alarms and Warnings Log or the Unacknowledged Alarms view, select the desired record and double click on it.

The Acknowledgement window displays for the selected record.



**Acknowledgement**

Entered By : Administrator

Entered On : 10/5/2005 15:59:31

Message : Door opened

OK History Cancel

Figure 7-25 Acknowledgement Window

**Note:** The only way to delete acknowledgements and messages is to delete the data they are associated with.

On the Acknowledgement window,

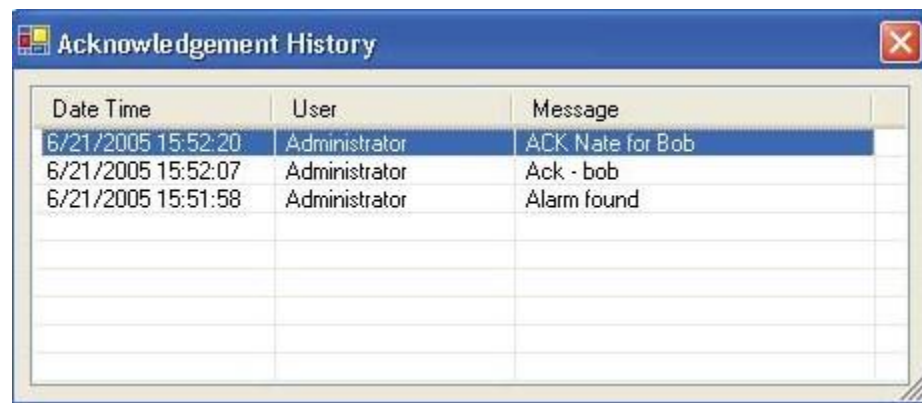
- Enter a message and click OK or select a predefined message by selecting from the Message field pulldown list.
- To add a predefined message, select "Setup Predefined Acknowledgements" from the Message pull-down list.

**Note:** After an alarm is acknowledged on the Unacknowledged Alarms view, the view refreshes and the record no longer appears because it has been acknowledged. View it instead on the Alarms and Warnings Log.

Acknowledgements and messages cannot be deleted directly. Only by deleting the data they are assigned to, does LMS Express RT delete the associated acknowledgements and messages.

In addition, acknowledgements and messages can not be over written. Modifying an existing message saves the old message, as it was and adds a new message for the updates or changes the user made.

To see the history of who added which messages when, click the History button on the Acknowledge window. Messages and their modifications are listed on the Acknowledgement History window.



Date Time	User	Message
6/21/2005 15:52:20	Administrator	ACK Nate for Bob
6/21/2005 15:52:07	Administrator	Ack - bob
6/21/2005 15:51:58	Administrator	Alarm found

Figure 7-26 Acknowledgement Window - History

### Enable/Disable Alarm Acknowledgement

On the “Acknowledgements” box on the Alarm Triggers screen’s Task Panel, users can set up predefined acknowledgement messages and enable/disable the Unacknowledged Alarms Exist alert



To enable or disable requiring alarms to be acknowledged, click on the Configure button on the Alerts Enabled section of the Task panel. On the Setup Acknowledgement Options window that appears, select Enable or Disable and click OK.

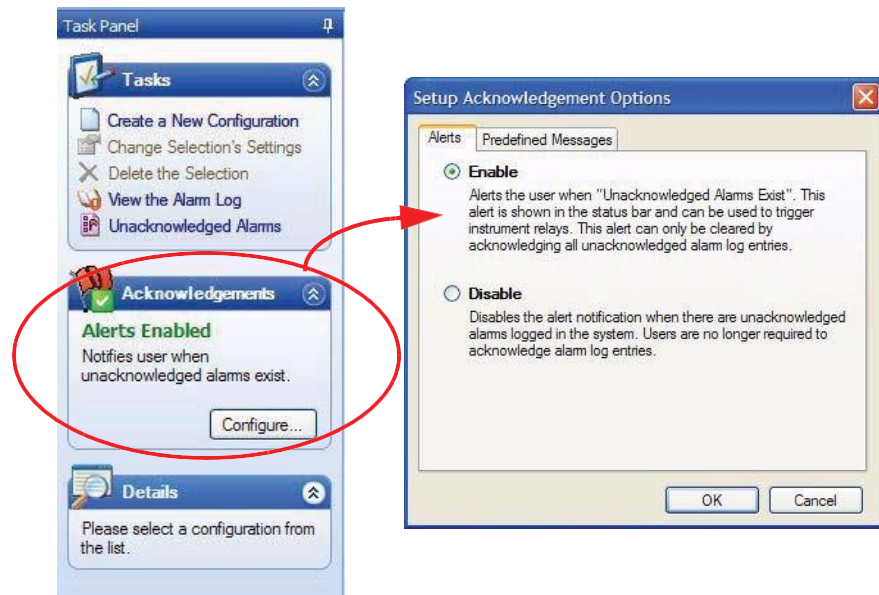


Figure 7-27 Setup Acknowledgement Options Screen

Users will be warned that all current unacknowledged alerts will be lost if they choose to disable Alert Acknowledgements.

### Predefined Acknowledgement Messages

Users can set up pre-defined messages to be used when acknowledging alerts.

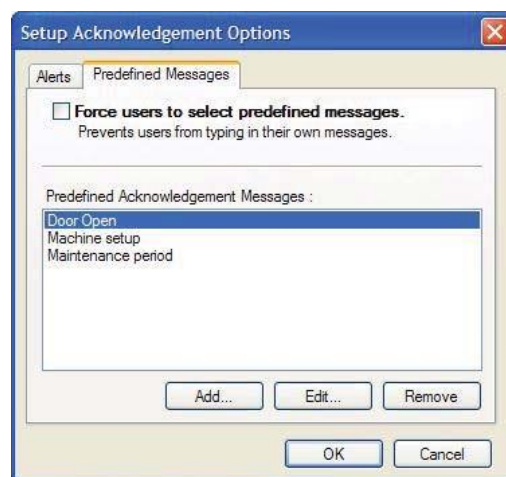


Figure 7-28 Predefined Acknowledgement messages

Blank Page



## Chapter 8 LMS Express Web Client

**Note:** The LMS Express Web Client uses the TCP port 5000 to communicate. You may have to ask the IT department to open (allow) port 5000 to be active on your network.

**LMS Express** includes a thin web client called the LMS Express Web Client. Users can view current status, reports and acknowledge alarms via their Internet Explorer, Google Chrome, or Mozilla Firefox browsers.

To View the LMS Express Web Client, enter <http://localhost:5000> in your browser window, where localhost is the IP address of the LMS Express Server. If users are enabled in Express then a Password Protection screen will prompt the user to enter valid credentials to access the Web Client.

### Home Screen

The web client Home screen displays the model name, channel name, location #, value, units, timestamp and alarm status of all real time instrument channels connected to LMS Express RT.

Current User

**Home**

**Users**

**Unacknowledged Alarms**

**Alarm Log**

**Event Log**


**Reports**

Model Name	Channel Name	Loc #	Value	Units	TimeStamp	Alarm Status
ApexZ3	ApexZ3 (01):Location 001:0.5 micron (Counts)	Location 001	0	#	3/26/2018 11:50:56 AM	Normal
ApexR5	ApexR5 (01):Location 002:5.0 micron (Counts)	Location 002	63	#	3/26/2018 11:51:09 AM	None
ApexR5	ApexR5 (01):Location 002:Sample Time	Location 002	60	s	3/26/2018 11:51:09 AM	None
ApexR5	ApexR5 (01):Location 002:Sample Volume	Location 002	1	ft³	3/26/2018 11:51:09 AM	None
ApexR5	ApexR5 (01):Location 002:0.5 micron (Counts)	Location 002	18173	#	3/26/2018 11:51:09 AM	None
ApexZ3	ApexZ3 (01):Location 001:3.0 micron (Counts)	Location 001	0	#	3/26/2018 11:50:56 AM	None
ApexZ3	ApexZ3 (01):Location 001:5.0 micron (Counts)	Location 001	0	#	3/26/2018 11:50:56 AM	None
ApexZ3	ApexZ3 (01):Location 001:Sample Volume	Location 001	1	ft³	3/26/2018 11:50:56 AM	None
ApexZ3	ApexZ3 (01):Location 001:Temperature	Location 001	77.65	F	3/26/2018 11:50:56 AM	None
ApexZ3	ApexZ3 (01):Location 001:Relative Humidity	Location 001	23.05	%	3/26/2018 11:50:56 AM	None
ApexZ3	ApexZ3 (01):Location 001:0.3 micron (Counts)	Location 001	0	#	3/26/2018 11:50:56 AM	None
ApexZ3	ApexZ3 (01):Location 001:Sample Time	Location 001	60	s	3/26/2018 11:50:56 AM	None
ApexZ3	ApexZ3 (01):Location 001:1.0 micron (Counts)	Location 001	0	#	3/26/2018 11:50:56 AM	None
ApexZ3	ApexZ3 (01):Location 001:10.0 micron (Counts)	Location 001	0	#	3/26/2018 11:50:56 AM	None

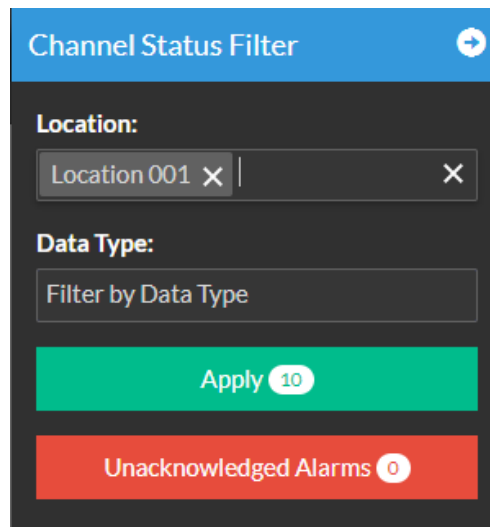
Unacknowledged Alarms 0 Normal

**Figure 8-1 LMS Express Web Client Home Screen**

The blue menu bar with the white buttons on the left side of the screen displays information about LMS Express Users, Unacknowledged Alarms, Alarm log, Event log and Reports.

Press the Navigation arrow  located on the top right-corner of the screen to display the 'Channel Status Filter' option.

**Note:** Data Types will only display for instruments connected to LMS Express.



The image shows a 'Channel Status Filter' dialog box. It has a blue header bar with the title 'Channel Status Filter' and a navigation arrow icon. Below the header, there are two input fields: 'Location:' with a text box containing 'Location 001' and a clear 'X' button, and 'Data Type:' with a dropdown menu showing 'Filter by Data Type'. At the bottom, there are two buttons: a green 'Apply' button with a white oval containing the number '10', and a red 'Unacknowledged Alarms' button with a white oval containing the number '0'.

**Figure 8-2 Channel Status Filter**

Select Locations to filter data channels.

Select Data Types to filter; Particle channel count, Relative Humidity, Temperature, or Sample Time to filter data channels.

The white oval on the Apply button will display the total filtered number of data channels connected in real-time.

Press the Apply button to apply the filter.

### Filter Home Page Datasets

Press the Apply button to filter the Home page data sets. Only those Locations and Data Types included in the filter will be displayed. When no filters are in place pressing the Apply button will display the unfiltered total number of connected real-time data channels in the database.

**All locations.**

The screenshot shows the Lighthouse Home screen with a table of data channels. The table has columns: Model Name, Loc #, Value, Units, TimeStamp, and Alarm Status. The data is filtered to show all locations. The right sidebar shows the Channel Status Filter with Location and Data Type filters. The Apply button is highlighted in green.

Model Name	Loc #	Value	Units	TimeStamp	Alarm Status
ApexZ3	Location 001	0	#	3/26/2018 4:13:56 PM	Normal
ApexR5	Location 002	64	#	3/26/2018 4:14:09 PM	None
ApexR5	Location 002	60	s	3/26/2018 4:14:09 PM	None
ApexR5	Location 002	1	ft*3	3/26/2018 4:14:09 PM	None
ApexR5	Location 002	12940	#	3/26/2018 4:14:09 PM	None
ApexZ3	Location 001	0	#	3/26/2018 4:13:56 PM	None
ApexZ3	Location 001	0	#	3/26/2018 4:13:56 PM	None
ApexZ3	Location 001	1	ft*3	3/26/2018 4:13:56 PM	None
ApexZ3	Location 001	79.54	F	3/26/2018 4:13:56 PM	None
ApexZ3	Location 001	23.14	%	3/26/2018 4:13:56 PM	None
ApexZ3	Location 001	0	#	3/26/2018 4:13:56 PM	None
ApexZ3	Location 001	60	s	3/26/2018 4:13:56 PM	None
ApexZ3	Location 001	0	#	3/26/2018 4:13:56 PM	None
ApexZ3	Location 001	0	#	3/26/2018 4:13:56 PM	None

Figure 8-3a Home Screen No Filters

**Filtered for Location 001 only.**

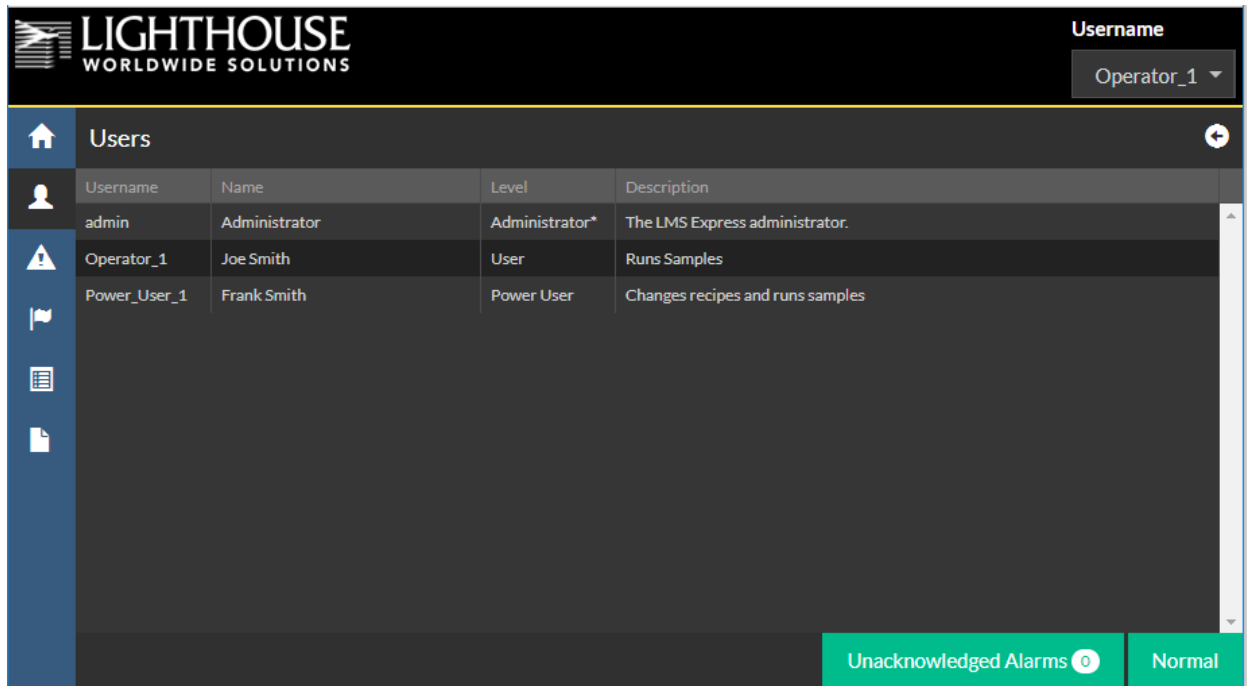
The screenshot shows the Lighthouse Home screen with the table filtered to show only data for Location 001. The right sidebar shows the Channel Status Filter with Location set to 'Location 001'. The Apply button is highlighted in green.

Model Name	Channel Name	Loc #	Value	Units	TimeStamp	Alarm Status
ApexZ3	ApexZ3 [01] Location 001:0.5 mi...	Location 001	0	#	3/26/2018 3:17:56 PM	Normal
ApexZ3	ApexZ3 [01] Location 001:Sampl...	Location 001	40	s	3/26/2018 3:17:56 PM	None
ApexZ3	ApexZ3 [01] Location 001:Sampl...	Location 001	1	ft*3	3/26/2018 3:17:56 PM	None
ApexZ3	ApexZ3 [01] Location 001:0.3 mi...	Location 001	0	#	3/26/2018 3:17:56 PM	None
ApexZ3	ApexZ3 [01] Location 001:1.0 mi...	Location 001	0	#	3/26/2018 3:17:56 PM	None
ApexZ3	ApexZ3 [01] Location 001:3.0 mi...	Location 001	0	#	3/26/2018 3:17:56 PM	None
ApexZ3	ApexZ3 [01] Location 001:5.0 mi...	Location 001	0	#	3/26/2018 3:17:56 PM	None
ApexZ3	ApexZ3 [01] Location 001:10.0...	Location 001	0	#	3/26/2018 3:17:56 PM	None
ApexZ3	ApexZ3 [01] Location 001:Tempe...	Location 001	78.96	F	3/26/2018 3:17:56 PM	None
ApexZ3	ApexZ3 [01] Location 001:Relati...	Location 001	23.77	%	3/26/2018 3:17:56 PM	None


Figure 8-3b Home Screen Filter on "Location 001"

## Users Screen

The web client User's screen displays the Username, Name, Level and Description of each user saved in the LMS Express user database.



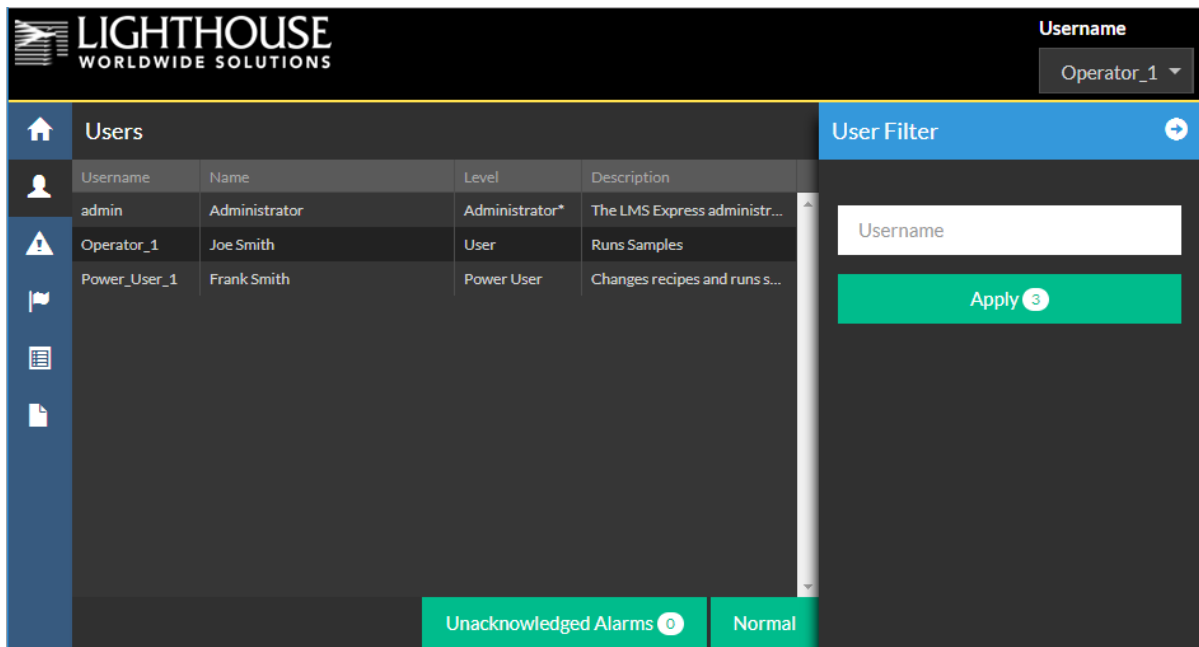
**Figure 8-4 Users**

Press the Navigation arrow  located on the top right-corner of the screen to display the 'User Filter' option.

### Filter Username List

Click on the Username button and enter a name to filter.

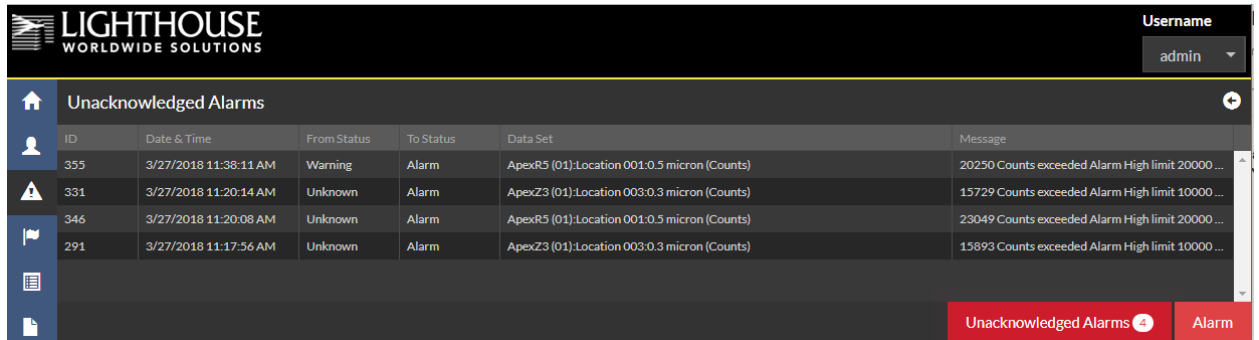
The white oval on the green Apply button will display the total number of usernames applied by the filter. Press the green Apply button to filter the user names list.



**Figure 8-5 User Filter**


## Unacknowledged Alarms

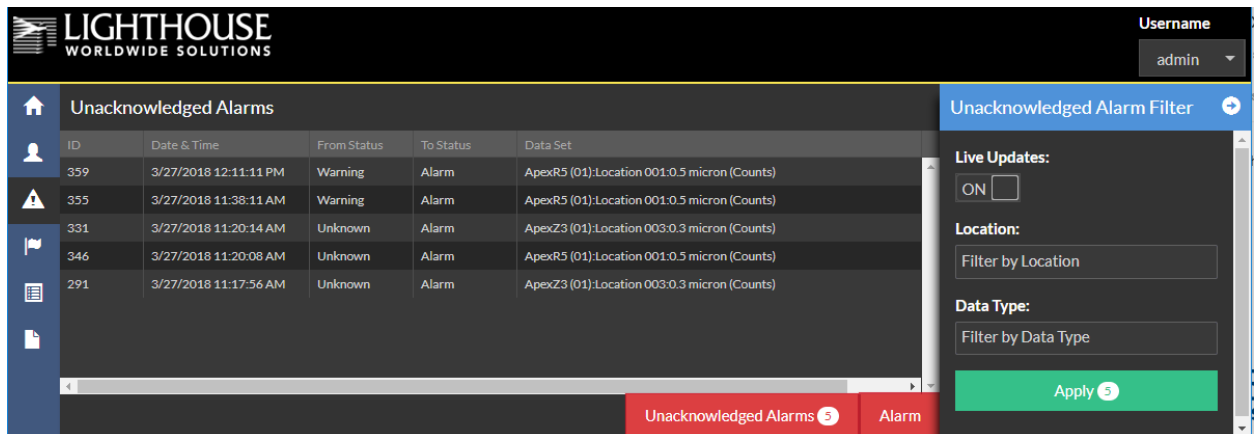
The LMS Express Web Client Unacknowledged Alarms screen displays the ID, Date & Time, From Status, To Status, Data Set and Message for all unacknowledged alarms recorded in the database.



ID	Date & Time	From Status	To Status	Data Set	Message
355	3/27/2018 11:38:11 AM	Warning	Alarm	ApexR5 (01):Location 001:0.5 micron (Counts)	20250 Counts exceeded Alarm High limit 20000 ...
331	3/27/2018 11:20:14 AM	Unknown	Alarm	ApexZ3 (01):Location 003:0.3 micron (Counts)	15729 Counts exceeded Alarm High limit 10000 ...
346	3/27/2018 11:20:08 AM	Unknown	Alarm	ApexR5 (01):Location 001:0.5 micron (Counts)	23049 Counts exceeded Alarm High limit 20000 ...
291	3/27/2018 11:17:56 AM	Unknown	Alarm	ApexZ3 (01):Location 003:0.3 micron (Counts)	15893 Counts exceeded Alarm High limit 10000 ...

Figure 8-6 Unacknowledged Alarms

Press the Navigation arrow  located on the top right-corner of the screen to display the 'Unacknowledged Alarm Filter' option.

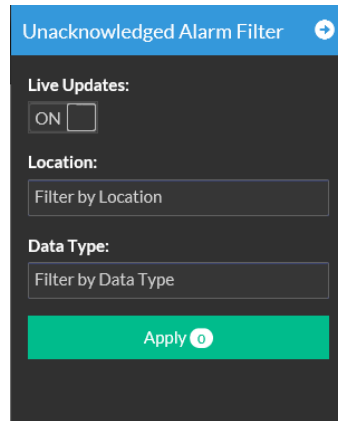


ID	Date & Time	From Status	To Status	Data Set
359	3/27/2018 12:11:11 PM	Warning	Alarm	ApexR5 (01):Location 001:0.5 micron (Counts)
355	3/27/2018 11:38:11 AM	Warning	Alarm	ApexR5 (01):Location 001:0.5 micron (Counts)
331	3/27/2018 11:20:14 AM	Unknown	Alarm	ApexZ3 (01):Location 003:0.3 micron (Counts)
346	3/27/2018 11:20:08 AM	Unknown	Alarm	ApexR5 (01):Location 001:0.5 micron (Counts)
291	3/27/2018 11:17:56 AM	Unknown	Alarm	ApexZ3 (01):Location 003:0.3 micron (Counts)

Figure 8-7 Unacknowledged Alarms Filter

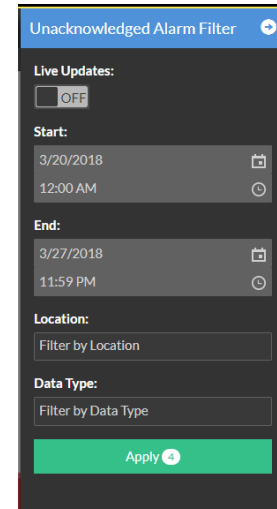
### Filter Unacknowledged Alarms List

Live Updates: ON will always display all unacknowledged alarms within the filter range set for Location and Data Type.



The screenshot shows the 'Unacknowledged Alarm Filter' interface. At the top, the title 'Unacknowledged Alarm Filter' is displayed with a plus icon. Below the title, the 'Live Updates:' section has the 'ON' radio button selected. The 'Location:' section contains a text input field with the placeholder 'Filter by Location'. The 'Data Type:' section contains a text input field with the placeholder 'Filter by Data Type'. At the bottom, there is a green 'Apply' button with a white circle containing the number '0'.

**Figure 8-8a Live Updates ON**



The screenshot shows the 'Unacknowledged Alarm Filter' interface. At the top, the title 'Unacknowledged Alarm Filter' is displayed with a plus icon. Below the title, the 'Live Updates:' section has the 'OFF' radio button selected. The 'Start:' section has two input fields: '3/20/2018' with a calendar icon and '12:00 AM' with a clock icon. The 'End:' section has two input fields: '3/27/2018' with a calendar icon and '11:59 PM' with a clock icon. The 'Location:' section contains a text input field with the placeholder 'Filter by Location'. The 'Data Type:' section contains a text input field with the placeholder 'Filter by Data Type'. At the bottom, there is a green 'Apply' button with a white circle containing the number '4'.

**Figure 8-8b Live Updates OFF**

Live Updates: OFF will only display unacknowledged alarms for the date range specified within the filter range set for Location and Data Type.

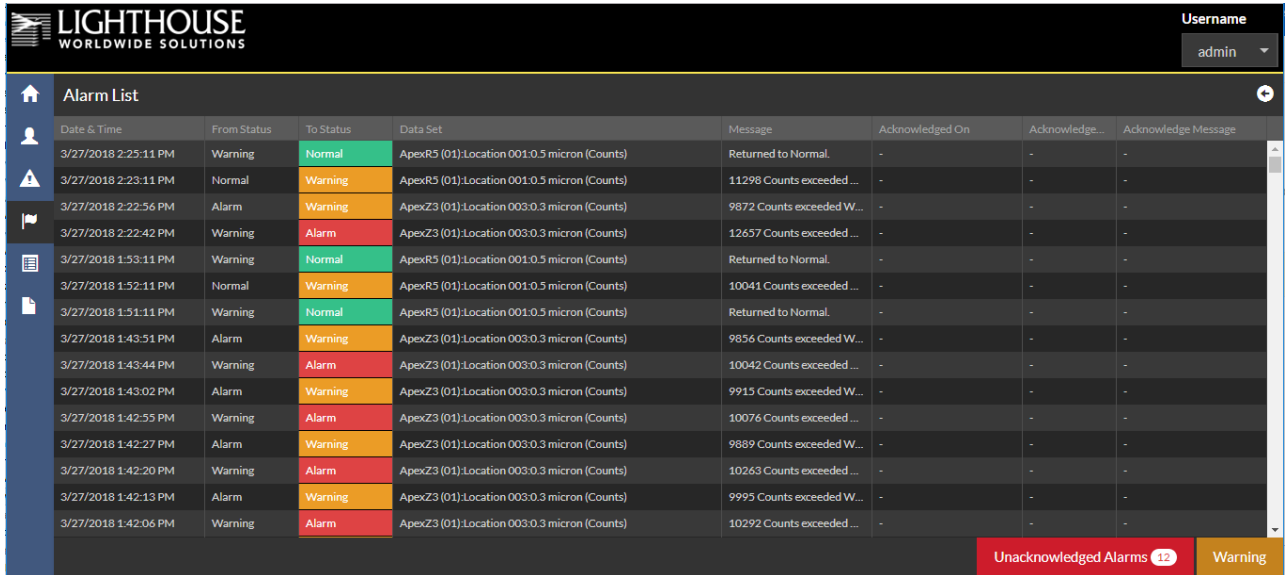
Enter the Start and End date and time for the filter and press the green Apply button. Select locations to filter. Select data types to filter and

Press Apply.

The white oval on the green Apply button will display the total number of unacknowledged alarms applied by the filter.


## Alarm List

The LMS Express Web Client Alarm List screen displays the Date & Time, From Status, To Status, Data Set, Message, Acknowledged On, Acknowledged By, and Acknowledge Message.



Date & Time	From Status	To Status	Data Set	Message	Acknowledged On	Acknowledge...	Acknowledge Message
3/27/2018 2:25:11 PM	Warning	Normal	ApexR5 (01) Location 001:0.5 micron (Counts)	Returned to Normal.	-	-	-
3/27/2018 2:23:11 PM	Normal	Warning	ApexR5 (01) Location 001:0.5 micron (Counts)	11298 Counts exceeded ...	-	-	-
3/27/2018 2:22:56 PM	Alarm	Warning	ApexZ3 (01) Location 003:0.3 micron (Counts)	9872 Counts exceeded W...	-	-	-
3/27/2018 2:22:42 PM	Warning	Alarm	ApexZ3 (01) Location 003:0.3 micron (Counts)	12657 Counts exceeded ...	-	-	-
3/27/2018 1:53:11 PM	Warning	Normal	ApexR5 (01) Location 001:0.5 micron (Counts)	Returned to Normal.	-	-	-
3/27/2018 1:52:11 PM	Normal	Warning	ApexR5 (01) Location 001:0.5 micron (Counts)	10041 Counts exceeded ...	-	-	-
3/27/2018 1:51:11 PM	Warning	Normal	ApexR5 (01) Location 001:0.5 micron (Counts)	Returned to Normal.	-	-	-
3/27/2018 1:43:31 PM	Alarm	Warning	ApexZ3 (01) Location 003:0.3 micron (Counts)	9856 Counts exceeded W...	-	-	-
3/27/2018 1:43:44 PM	Warning	Alarm	ApexZ3 (01) Location 003:0.3 micron (Counts)	10042 Counts exceeded ...	-	-	-
3/27/2018 1:43:02 PM	Alarm	Warning	ApexZ3 (01) Location 003:0.3 micron (Counts)	9915 Counts exceeded W...	-	-	-
3/27/2018 1:42:35 PM	Warning	Alarm	ApexZ3 (01) Location 003:0.3 micron (Counts)	10076 Counts exceeded ...	-	-	-
3/27/2018 1:42:27 PM	Alarm	Warning	ApexZ3 (01) Location 003:0.3 micron (Counts)	9889 Counts exceeded W...	-	-	-
3/27/2018 1:42:20 PM	Warning	Alarm	ApexZ3 (01) Location 003:0.3 micron (Counts)	10263 Counts exceeded ...	-	-	-
3/27/2018 1:42:13 PM	Alarm	Warning	ApexZ3 (01) Location 003:0.3 micron (Counts)	9995 Counts exceeded W...	-	-	-
3/27/2018 1:42:06 PM	Warning	Alarm	ApexZ3 (01) Location 003:0.3 micron (Counts)	10292 Counts exceeded ...	-	-	-

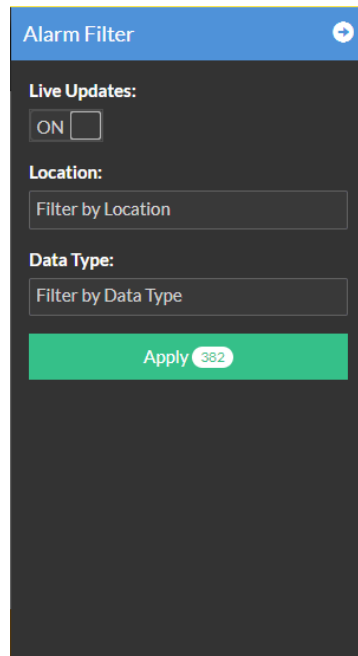
Figure 8-9 Alarm List

Press the Navigation arrow  located on the top right-corner of the screen to display the Alarm Filter option.



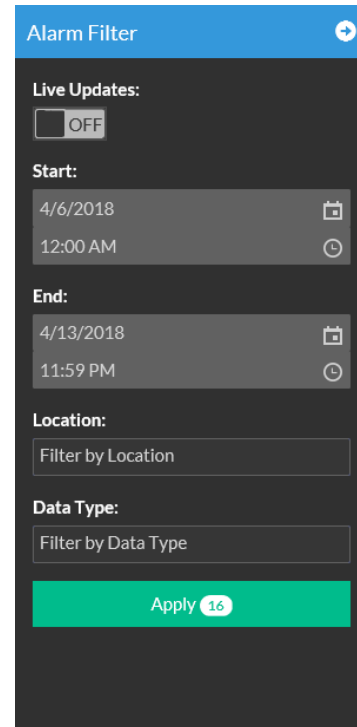
## Filter Alarm List

Live Updates: ON will always display all alarms within the Alarm Filter range for Location and Data Type.



The screenshot shows the 'Alarm Filter' interface. At the top is a blue header with the text 'Alarm Filter' and a right-pointing arrow icon. Below the header, the 'Live Updates:' section has a toggle switch set to 'ON'. The 'Location:' section contains a text input field with the placeholder 'Filter by Location'. The 'Data Type:' section contains a text input field with the placeholder 'Filter by Data Type'. At the bottom is a green 'Apply' button with a white oval containing the number '382'.

**Figure 8-10a Live Updates ON**



The screenshot shows the 'Alarm Filter' interface. At the top is a blue header with the text 'Alarm Filter' and a right-pointing arrow icon. Below the header, the 'Live Updates:' section has a toggle switch set to 'OFF'. The 'Start:' section has two input fields: the first shows '4/6/2018' with a calendar icon, and the second shows '12:00 AM' with a clock icon. The 'End:' section has two input fields: the first shows '4/13/2018' with a calendar icon, and the second shows '11:59 PM' with a clock icon. The 'Location:' section contains a text input field with the placeholder 'Filter by Location'. The 'Data Type:' section contains a text input field with the placeholder 'Filter by Data Type'. At the bottom is a green 'Apply' button with a white oval containing the number '16'.

**Figure 8-10b Live Updates OFF**

Live Updates: OFF will only display alarms for the date range specified and within the filter range set for location and data type.

Select a Start date/time, End date/time to filter alarms.

Select locations to filter.

Select data types to filter.

The white oval on the green Apply button will display the total number of alarms applied by the filter.

Press the Apply button.

## Event Log


The LMS Express Web Client Event Log screen displays the Date & Time, Type, User and Message for every LMS Express action/event.

Date & Time	Type	User	Message
3/27/2018 12:52:08 PM	Add	Administrator	Acknowledged "Alarms and Warnings" log entry 359.
3/27/2018 11:24:11 AM	Driver	System	[COM4\Address11] Instrument started.
3/27/2018 11:24:05 AM	Modify	Administrator	Enabled instrument address 11 on COM4.
3/27/2018 11:22:26 AM	Add	Administrator	Added alarm configuration "Over 20000".
3/27/2018 11:20:11 AM	Driver	System	[COM4\Address11] Instrument stopped.
3/27/2018 11:20:10 AM	Modify	Administrator	Disabled instrument address 11 on COM4.
3/27/2018 11:18:10 AM	Modify	Administrator	Sampling instrument address 1 on TCP/IP 10.8.100.10:8181.
3/27/2018 11:18:10 AM	Modify	Administrator	Enabled instrument address 1 on TCP/IP 10.8.100.10:8181.
3/27/2018 11:18:04 AM	Modify	Administrator	Not Sampling instrument address 1 on TCP/IP 10.8.100.10:8181.
3/27/2018 11:18:04 AM	Modify	Administrator	Disabled instrument address 1 on TCP/IP 10.8.100.10:8181.
3/27/2018 11:18:04 AM	Modify	Administrator	Enabled instrument address 1 on TCP/IP 10.8.100.10:8181.
3/27/2018 11:18:04 AM	Driver	System	[TCP/IP 10.8.100.10:8181\Address01] Instrument started.
3/27/2018 11:16:08 AM	Driver	System	[COM4\Address11] Instrument started.

1 - 100 of 110 items

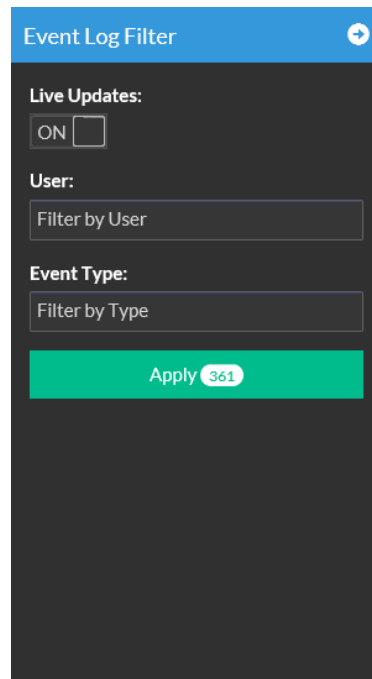
Unacknowledged Alarms 13 Warning

**Figure 8-11 Event Log**

Press the Navigation arrow  located on the top right-corner of the screen to display the Alarm Filter option.

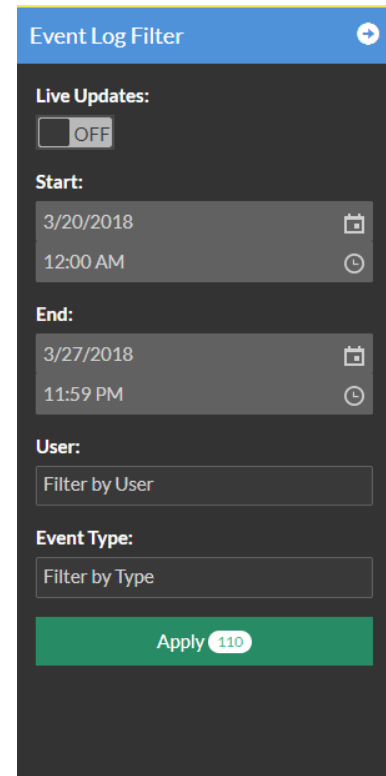
## Filter Event Log

Live Updates: ON will always display all events regardless of date.



The screenshot shows the 'Event Log Filter' interface. At the top is a blue header with the title 'Event Log Filter' and a right arrow icon. Below the header, the 'Live Updates:' section has a toggle switch set to 'ON'. The 'User:' section contains a text input field with the placeholder 'Filter by User'. The 'Event Type:' section contains a text input field with the placeholder 'Filter by Type'. At the bottom is a green 'Apply' button with a white oval containing the number '361'.

**Figure 8-12a Event Log Filter  
Live Updates: ON**



The screenshot shows the 'Event Log Filter' interface. At the top is a blue header with the title 'Event Log Filter' and a right arrow icon. Below the header, the 'Live Updates:' section has a toggle switch set to 'OFF'. The 'Start:' section contains two input fields: the first shows '3/20/2018' with a calendar icon, and the second shows '12:00 AM' with a clock icon. The 'End:' section contains two input fields: the first shows '3/27/2018' with a calendar icon, and the second shows '11:59 PM' with a clock icon. The 'User:' section contains a text input field with the placeholder 'Filter by User'. The 'Event Type:' section contains a text input field with the placeholder 'Filter by Type'. At the bottom is a green 'Apply' button with a white oval containing the number '110'.

**Figure 8-12b Event Log Filter  
Live Updates: OFF**

Live Updates: OFF will only display alarms for the date range specified.

Select a Start date/time, End date/time to filter events.

Select Users to filter.

Select Event Types to filter.

The white oval on the green Apply button will display the total number of events applied by the filter.

Press the green Apply button to display the filtered Event Log.

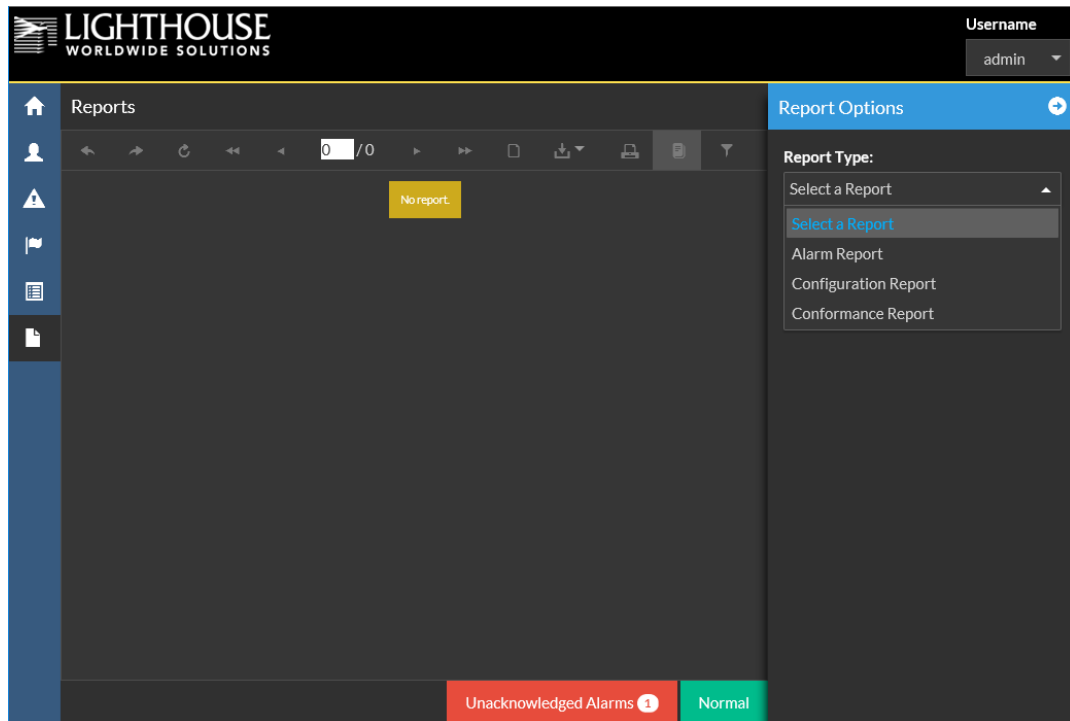
## Reports

The LMS Express Web Client Report screen displays options for three different report types:


**Alarm Report**

**Configuration Report**

**Conformance Report**



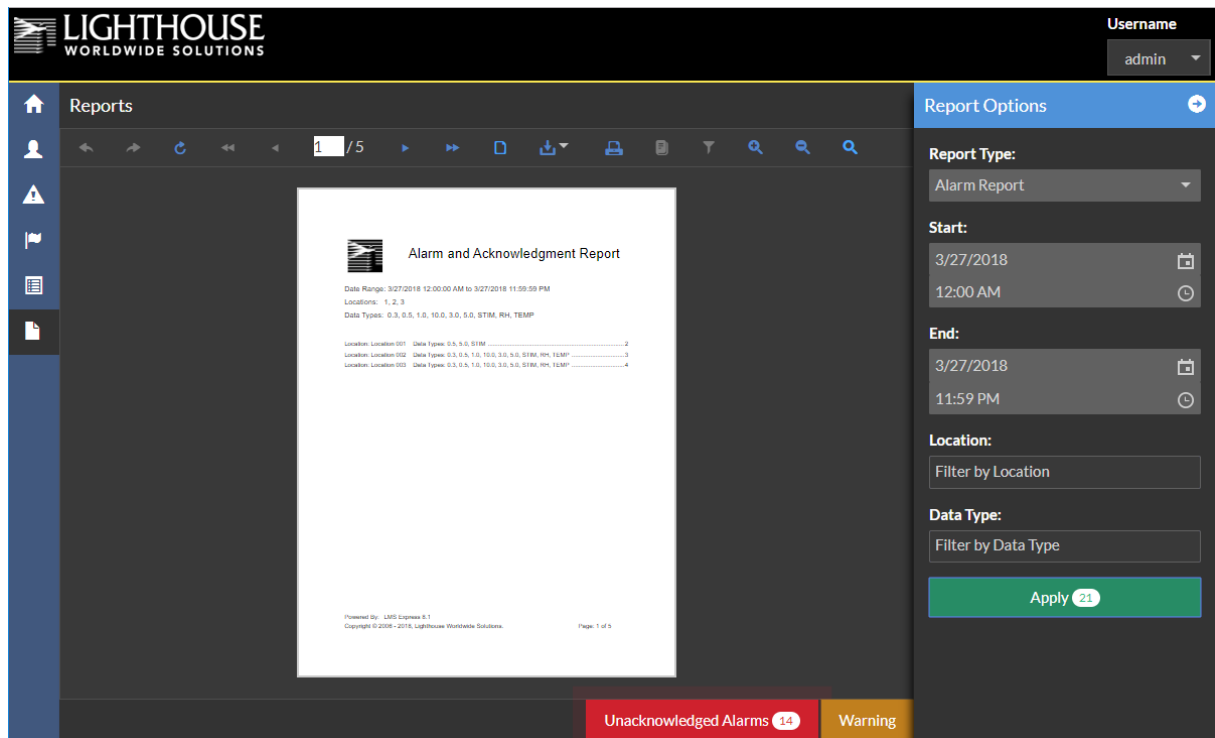
**Figure 8-13 Reports**

Press the Navigation arrow  button located on the top right-corner of the screen to display the Report options.

Select Report Type Alarm Report and the Report Options menu will display.

## Alarm Report

Select Report Type “Alarm Report”



### Figure 8-14 Alarm Report

Enter the Start date/time and End date/time to filter for the report data.

Select Locations to filter.

Select Data Types to filter.

Then press **Apply**.

## Configuration Report

Select Report Type “Configuration Report”

Then press Apply.

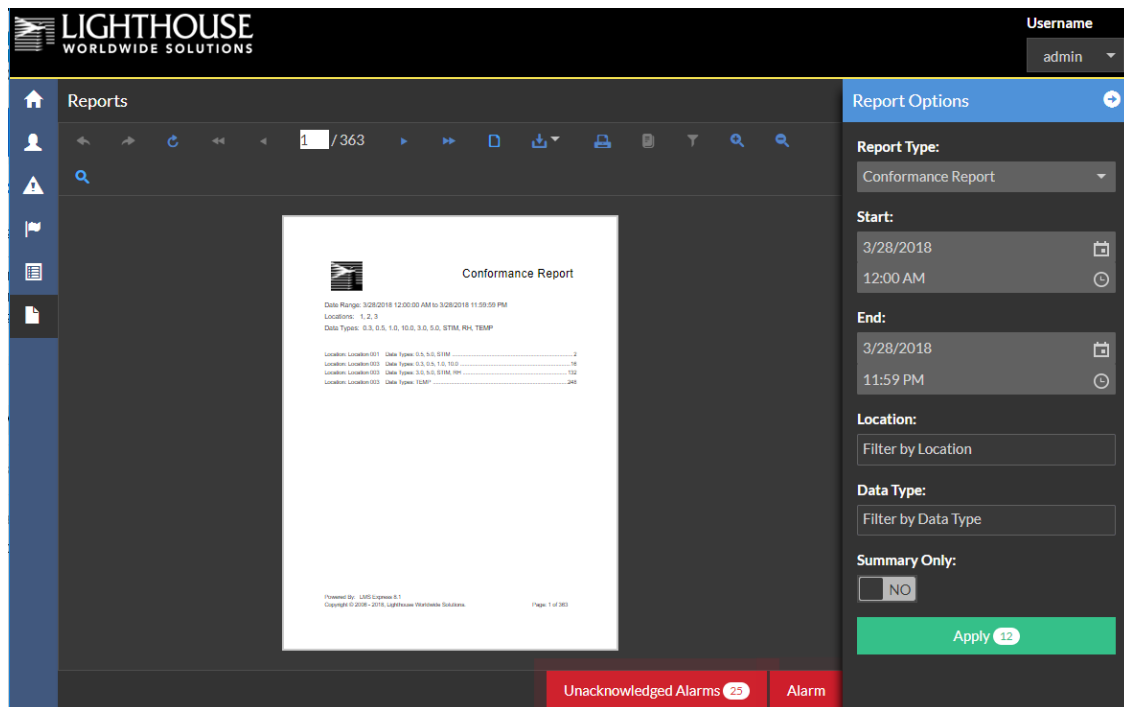
The screenshot displays the Lighthouse Worldwide Solutions LMS Express interface. The top navigation bar includes the company logo and a username dropdown set to 'admin'. The main content area is titled 'Reports' and features a sidebar with navigation icons. The central display shows a 'Configuration Report' for 'Alarm Triggers'. The report includes a table with columns for Name, Enabled, Delay Type, Warning Low, Alarm Low, and Links. The table lists two alarm triggers: 'Alarm High' and 'Alarm Low'. The 'Alarm High' trigger is enabled with a 0.5-second delay and a warning low of 10000.000. The 'Alarm Low' trigger is enabled with a 0.5-second delay and a warning low of 10000.000. The report is generated by LMS Express 8.1 and is the first of three pages. At the bottom of the interface, there are two red buttons: 'Unacknowledged Alarms' with a count of 21 and 'Alarm'.

Name	Enabled	Delay Type	Warning Low	Alarm Low	Links
Alarm High	Enabled	Warning High	Warning Low	Alarm Low	Delay Warnings
Alarm Low	Enabled	0.5 seconds (Automatic Control)	10000.000	10000.000	Control

Figure 8-15 Configuration Report

## Conformance Report

Select Report Type “Conformance Report”



**Figure 8-16 Conformance Report**

Select a Start date/time, End date/time to filter the data sets.

Select locations to filter.

Select data types to filter.

Select Summary Only ON or OFF.

The white oval on the green Apply button will display the total number of filtered channels.

Then press Apply.

**Blank Page**



# Chapter 9      System Setup

This chapter describes commands to setup the system, enable password protection and perform database maintenance.

## Administrator Options

---



The following properties and system controls are available from the Home menu, under Administrator Options.

- Alarm Triggers: create, update, maintain alarm and warning conditions.
- Application Properties: setup properties for views, units and signatures.
- Database Maintenance: archive database, open archives, delete data.
- Event Log: View and maintain event logs; post custom notes to log.
- Instruments: view instruments information; change instrument names.
- Locations: view locations; change location names.
- User Accounts: setup, update and delete user accounts and logins.



## Unit Conversion and Other Application Properties

---

To set **Express** properties, click the Home button, Administrator Options then Unit Conversion and Other Application Properties. The view area updates to display the Application Properties view.

On this view administrators set and maintain configuration for signatures, units of measure and other properties.

Figure 9-1 Application Properties View

## Units

On the Units section of the **Express** Properties window users can set the units of measure displayed with the data on graphs, reports, data table and other data visualization features.

Figure 9-2 Units of Measure, Application Properties

Set the display units for each type of data by selecting a value on the pull down list of possible units attached to each data type.

## Normalized Counts

Set the units for displaying normalized counts by selecting a value from the pulldown menu on the Normalized Count's field. Units include "particles/ft<sup>3</sup>", "particles/m<sup>3</sup>", "particles/L" and "particles/ml".

## Sample Volume

Set the units for displaying sample volume data by selecting a value from the pulldown menu on the Sample Volume's field. Units include "cubic feet", "cubic meters," "milliliters" and "liters".

## Sample Time

Set the units for displaying sample time data by selecting a value from the pulldown menu on the Sample Time's field. Units include "seconds", "minutes" and "hours".

## Temperature

Set the units for displaying temperature data by selecting a value from the pulldown menu on the Temperature's field. Units include "Fahrenheit", "Celsius" and "Kelvin".

## Air Velocity

Set the units for displaying air velocity data by selecting a value from the pulldown menu on the Air Velocity's field. Units are "ft/min." and "m/sec.".

## Diff. Pressure (Differential Pressure)

Set the units for displaying differential pressure data in by selecting a value from the pulldown menu on the Diff. Pressure's field. Units include ""H<sub>2</sub>O", ""Hg", "mmH<sub>2</sub>O", "mmHg", "cmHg", "Pa", "kPa", "Bar" and "mBar".

## Conductivity Sensor

Set the units for displaying the conductivity sensor data by selecting a value from the pulldown menu on the Conductivity Sensor field. Units include "MicroSiemens/cm" and "MegaOhms-cm".

## IAQ Mass Concentration

Set the units for displaying the IAQ Mass Concentration by selecting a

value from the pulldown menu on the IAQ Mass Concentration field. Units include "micrograms/m<sup>3</sup>" and micrograms/ft<sup>3</sup>".

### Displaying Units

Changing the type of units displayed for a type of data causes the data to automatically be converted, if appropriate, to the new unit of measure.

Units of measure are displayed on graphs, data tables and standard reports as follows.

### Graph

Units are displayed for each data set on the Graph's legend.

Location 000:0.5 micron (Normalized) (p/ft <sup>3</sup> )	Location 000:0.3 micron (Counts)
Location 000:1.0 micron (Counts)	Location 000:1.0 micron (Normalized) (p/ft <sup>3</sup> )
Location 000:Analog 1:Temperature (F)	Location 000:Analog 2:Relative Humidity (%)

Figure 9.3 Graph legend, displaying units in parenthesis

### Data Table

Units are displayed for each data set in the header of the Data Table.

6/27/2005 10:38:00 to 6/28/2005 10:38:00				
Time Stamp	HANDHELD 3016 (01)	HANDHELD 3016 (01)	HANDHELD 3016 (01)	HANDHELD 3016 (01)
	Location 000	Location 000	Location 000	Location 000
			Analog 1	Analog 2
	0.3 micron	0.5 micron	Temperature	Relative Humidity
	(Counts)	(Counts)	(F)	(%)

Figure 9-4 Data table, displaying units of measure

### Standard Report

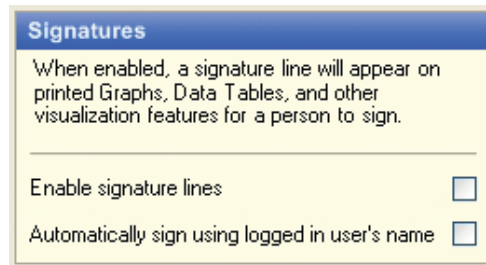
Units are displayed on the Standard Report; however, they are specified by the report standard. They cannot be set on the Properties page.

Particle Size: 0.3 micron			
Location	Samples	Min Volume (liters)	Average Particles/m <sup>3</sup>
Cleanroom 1	10	28.3	374.3
Cleanroom 10	10	28.3	307.0
Cleanroom 2	10	28.3	378.1

Figure 9-5 Standard Report Units

## Signatures

To print a signature line and/or user name on the data table, graph, or standard report, set these parameters:



**Signatures**

When enabled, a signature line will appear on printed Graphs, Data Tables, and other visualization features for a person to sign.

Enable signature lines ☐

Automatically sign using logged in user's name ☐

Figure 9-6 Signature Properties

### Enable Signature Lines

To add a signature line to the bottom right corner of a graph, check the Enable Signature Line's check box in the Signatures section of the Application Properties view. If this check box is enabled, a blank signature line appears on printouts of the graph.

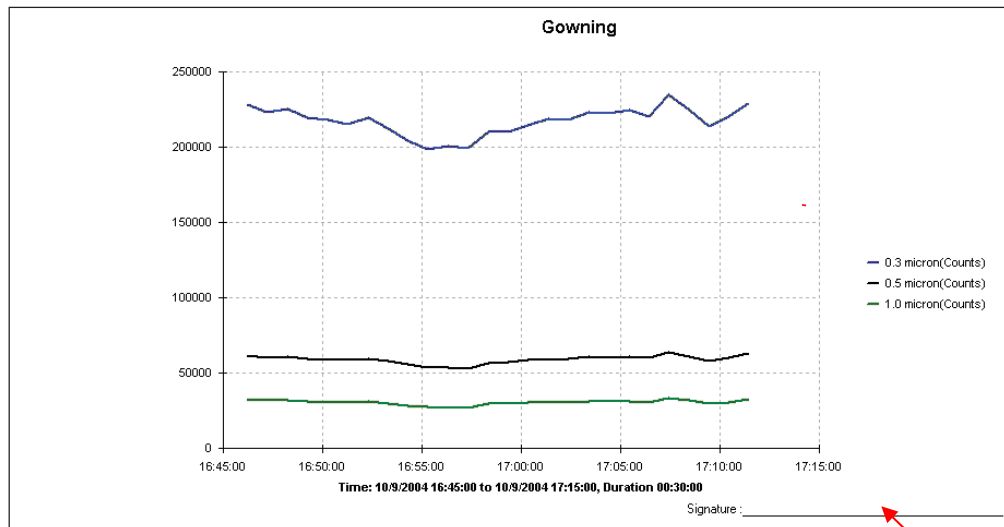


Figure 9-7 Signature Line, Graph Printout

Signature Line

### Automatically Sign Using Logged in User's Name

To include the full name of the current user on the signature line of graph printouts, check both Enable Signature Lines and Automatically sign Logged in User's Name.

See the following example.

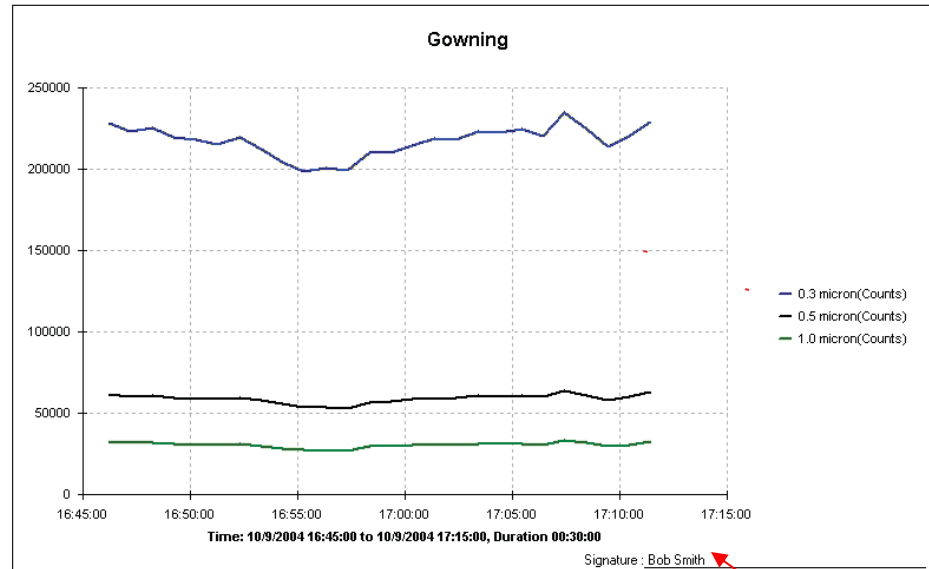


Figure 9-8 Graph Printout with Signature Line, User's Name

Full Name on  
Signature Line

When both Enable Signatures and Automatically Sign are checked, the user's full name is included in the data table's header and printed on each page of the data table.

Signature: Bob Smith			
6/23/2003 11:35:09 to 6/23/2003 11:45:09			
	Location 0	Location 0	Location 0
	0.1 micron	0.15 micron	0.2 micron
Time Stamp	(#)	(#)	(#)
6/23/2003 11:35:20	31.000	27.000	22.000
6/23/2003 11:36:32	69.000	39.000	22.000

Full Name of Login

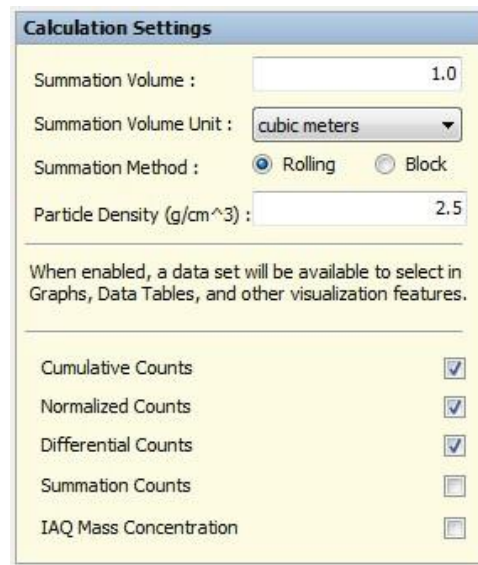
Figure 9-9 Data Table with Enable and Print User Name enabled

For Standard Reports, if Enable Signatures and Automatically Sign are both checked, **Express** includes the user's full name on the bottom of each page of the report that is printed.

In addition, if Enable Signatures and Automatically Sign are both checked, **Express** includes the user's full name on the bottom of each page of the alarm log or map that is printed.

## Calculation Settings

The Calculation Settings section of the Properties window allows administrators to configure the summation parameters for Summation and IAQ Mass Concentration Calculations. See Figure 9-10.



The screenshot shows a dialog box titled "Calculation Settings". It contains the following fields and options:

- Summation Volume : 1.0
- Summation Volume Unit : cubic meters (dropdown menu)
- Summation Method : ☒ Rolling ☐ Block
- Particle Density (g/cm<sup>3</sup>) : 2.5

Below these fields is a text box that reads: "When enabled, a data set will be available to select in Graphs, Data Tables, and other visualization features."

At the bottom, there is a list of checkboxes:

Option	Checked
Cumulative Counts	<input checked="" type="checkbox"/>
Normalized Counts	<input checked="" type="checkbox"/>
Differential Counts	<input checked="" type="checkbox"/>
Summation Counts	<input type="checkbox"/>
IAQ Mass Concentration	<input type="checkbox"/>

**Figure 9-10 Calculation Settings**

### Summation Volume

Enter the volume of air to be sampled for the summation

### Summation Volume Unit

Sets the unit for Summation Volume by selecting a volume from the pulldown. The units include "cubic feet", "cubic meters", "liters" and "milliliters".

### Summation Method

The summation of particle counts can be calculated in two methods. The two methods are rolling and block (non-rolling). The method is set by selecting the radio button for the required method.

- The rolling method sums raw particle counts for one cubic meter as a data point. Subsequent data points are then calculated by replacing the earliest particle counts with the latest particle counts.

- The block method sums particle counts for one cubic meter as the first one data point. Subsequent data points are then calculated on every block of particle counts for one cubic meter.

## Particle Density

The default value is 2.5 g/cm<sup>3</sup>. It is used in the IAQ Mass Concentration calculation.

## Enable/Disable Data Sets

When enabled, a data set will be available to select in Graphs, Data Tables, and Other visualization features. Check the checkboxes against each data set to enable and uncheck to disable.

## Other Properties

The Other Properties section of the Properties window allows administrators to configure the following additional system properties.

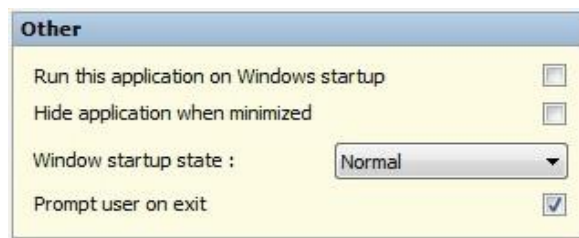


Figure 9-11 Other Properties

### Run this application on Windows Startup

When “Run this application on Windows Startup” is checked, **Express** automatically starts after the user logs onto Windows.

### Hide application when minimized

When “Hide application when minimized” is checked, the application will be hidden from the desktop when minimized. It can be restored only by clicking the LMS Express system tray icon.



## Windows startup state

This property sets the state on the main LMS Express application to Normal, Minimized, Maximized or Full Screen during Windows' startup. If the application should be hidden at startup, select "Minimized" and check the "Hide application ..." property. The application's desktop shortcut will override the startup state only when the state is set to "Normal".

## Prompt User on Exit

When Prompt User on Exit is checked, and the user tries to exit the application, a popup prompts the user that real-time data collection will stop and asks the user whether to proceed with the exit.

When it is unchecked, the popup prompt will not display even when real-time data collection is ongoing.



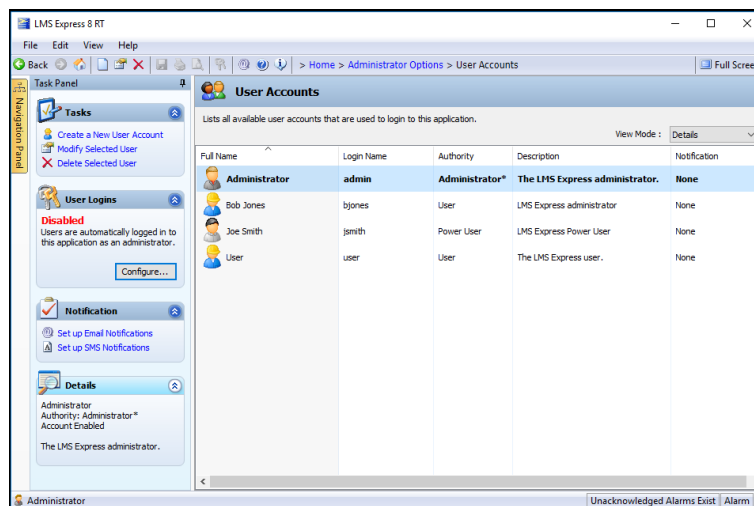
**Note:** To add, modify, or delete user accounts, the user must be logged in as an administrator.

## User Accounts

The User Accounts section of **Express** allows administrators to add, maintain and delete user accounts.

Click the Home button, Administrator Options then Manage User Accounts and Logins to view the current user accounts.

Figure 9-12 is an example of the User Accounts view.



**Figure 9-12 User Accounts view**

The User Accounts Screen displays the Full Name, Login Name, Authority, Description and Notification of each user account.

The user account list can be sorted by clicking on any of the column headers, full name, login name, authority, description or notification.

Express provides 3 user access levels named User, Power User and Administrator. In addition one super admin account named “**admin**” is available. The admin user is created when **Express** is installed and its indicated authority will be indicated as “Administrator\*”. This account cannot be deleted and additional Administrator\* accounts cannot be created.

When first installed **Express** contains 2 pre-configured user accounts: Administrator (the Administrator\* level account) and User (a User level account).

The following sections describe how to add, modify and delete additional **Express** user accounts.

## Task Panel

Administrators can access User Account options from the Task Panel and the toolbar.

When the list of user accounts is visible on the User Accounts view, a Task Panel appears on the left side of the **Express** window.

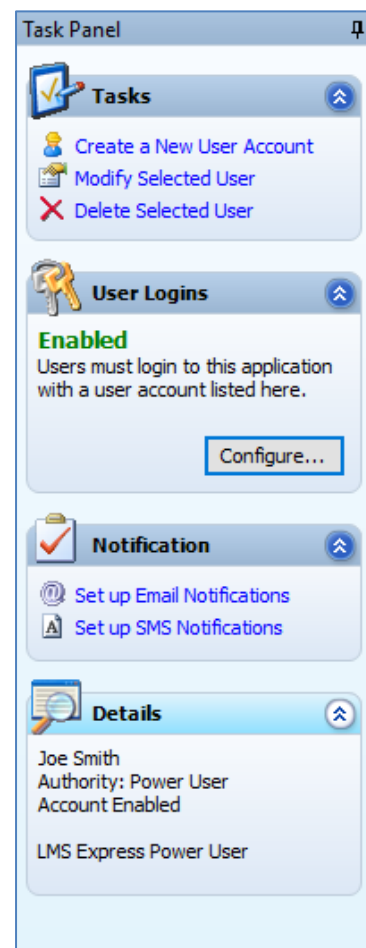


Figure 9-13 User Accounts Task Panel

The User Accounts Task Panel contains four sections: Tasks, User Logins Notifications and Details.

- Under the Tasks section users can create a new user account, modify a selected user account and/or delete a selected user account.
- Under the User Logins section, administrators can set system restrictions such as requiring users to log into LMS Express and requiring users and administrators to authenticate additions and modifications.
- Under the Notification section, administrators can set up email and SMS notifications for sensor alarm conditions and alerts.
- Under the Details section, users see details about the currently selected user account.

### Tool Bar Buttons

When the User Accounts view is displayed the following toolbar buttons are enabled:




Button	Function
	<b>New:</b> Add a new user account.
	<b>Setup:</b> Modify a selected user account.
	<b>Delete:</b> Delete a selected user account.

Table 9-14 User Accounts Toolbar Buttons

## Add a User

To add a new user account, while the User Accounts view is displayed, click on the New button on the toolbar and the User Setup window will pop up. Alternatively click on Create a New User Account on the User Accounts Tasks panel, or right click on the User Accounts view area and then click Add on the popup menu that appears:



Figure 9-15 Users View, Add Users Menu

A new User Setup window displays.

The screenshot shows the 'User Setup' window. It has a title bar with the text 'User Setup' and a close button. The window is divided into three sections: 'User Information', 'Notification', and 'Enable Password'. The 'User Information' section has fields for 'Enable User' (checkbox), 'Login Name', 'Full Name', 'User Description', 'Authority' (dropdown), and 'Auto-Logout' (dropdown). The 'Notification' section has fields for 'Email Notification' (checkbox), 'Email Address', 'SMS Notification' (checkbox), and 'Phone Number'. The 'Enable Password' section has fields for 'Login Password' (button), 'Change On Login' (checkbox), and 'Password Expires' (dropdown). At the bottom are 'OK' and 'Cancel' buttons.

Section	Field	Value
User Information	Enable User	<input checked="" type="checkbox"/>
	Login Name	
	Full Name	
	User Description	
	Authority	User
	Auto-Logout	10 minutes
Notification	Email Notification	<input type="checkbox"/>
	Email Address	
	SMS Notification	<input type="checkbox"/>
	Phone Number	
Enable Password	Enable Password	<input checked="" type="checkbox"/>
	Login Password	Enter Password...
	Change On Login	<input checked="" type="checkbox"/>
	Password Expires	Never

Figure 9-16 Setup User, New User

To create a new user, enter (or select) values for the following fields:

**Enable User:** Check this box to enable the user account. If Enable User is not checked, the user will not be able to log into **Express** even though the user account exists.

**Login Name:** Enter a login name for the user. Login names must be between 3 and 32 characters in length. Login names must be unique and must contain only Western European letters, numbers and underscores. Login names are case insensitive.

**Full Name:** Enter the full name of the user. Full names must be between 3 and 64 characters in length.

**User Description:** Enter a description for the user or user account. User Descriptions can be up to 64 characters long and are optional.

**Authority:** Select an authority type for the user from the Authority drop down list. Available Authority types are User, Power User and Administrator. The default is User.

Users can create and display their own graphs, data tables, standard reports and also view the system event and alarm logs.

Power Users are user accounts with the additional ability to acknowledge alarms, start and stop real time data collection and close the application.

Administrators are power user accounts that can also access the Administrator Options section; add, update, delete or view all configurations; perform database maintenance tasks and set up real time data collection.

The currently logged in user's account type (Admin, Power User or User) and name are displayed on the bottom left corner of the status bar.

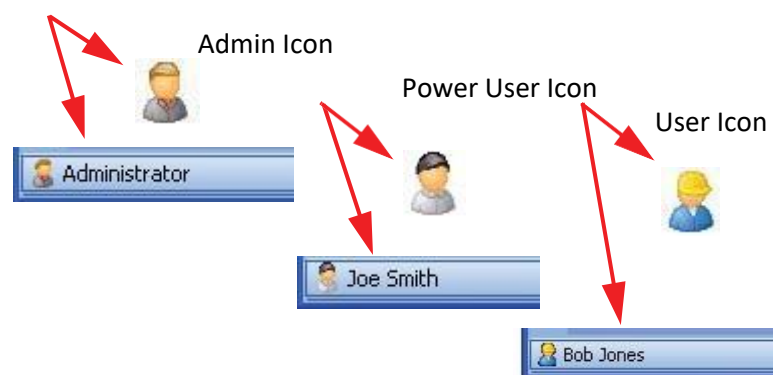


Figure 9-18 Auto-Logout Count Down

**Note:** Auto-logout is suspended while manually downloading data.

**Note:** If Enable Password is not checked users can start Express after only entering or selecting a login name on the Express login window.

**Note:** If Express auto-logs out the user, it notes the auto-logout event in its event log and returns to the Home view.

**Note:** The default admin account does not have a password when LMS Express is installed. For security, add a password after installation.

**Auto-Logout:** To have a user automatically logged out of **Express** after a period of non-use, select an Auto-Logout duration from the Auto-Logout list box. Durations range from 1 minute to 1 hour. The default is 10 minutes. To never have the user automatically logged out, select “Never”.

**Express** issues a 15 second warning before it automatically logs out a user. It warns the user that they are about to be logged out by flashing the application in the Window’s taskbar, playing a sound file and displaying the following count down window:



Figure 9-19 Auto-Logout Count Down

If the user clicks the “Don’t Logout” button before the 15 second count down finishes, **Express** resets the auto-logout timer and does not log out the user.

**Email Notification:** Click on Enable Notification to enable email alerts to be sent to this user.

**Email Address:** Enter user email address for this user to receive email alerts.

**SMS Notification:** Click on SMS Notification to enable SMS alerts to be sent to this user’s phone number (third party SMS provider subscription required).

**Phone Number:** Enter the user phone number to receive SMS alerts.

**Enable Password:** If the user’s site requires users to enter a password when they login to **Express**, check Enable Password. Passwords are optional for user accounts, but Administrator and Power Users are required to have a password.

**Login Password:** Press the Enter Password button to enter a password for this user network email account

**Change on Login:** If the administrator wants to force a user to change the password when they first log into **Express**, check Change on Login.

If Change on Login is checked, when the user attempts to start **Express** for the first time, the following Setup Password window appears. A user cannot login until the password is changed.



Figure 9-20 Change Password On Login

**Password Expires:** If the administrator wants a user's **Express** password to expire after a certain period of time and force the user to change the password, select duration from the Password Expired pull down list.

When a password expires and the user next logs into **Express**, the user will see the following Setup Password window:



Figure 9-21 Expired Password Login

On the Setup Password window the user must change their password to a different password in order to log in.

When all of the user's information has been entered, click OK to create the new user or Cancel to close the window without creating the account.

## Modify User

To modify an existing user account, double click on the user account row on the User Accounts view; right click on the user account and select Setup from the pop up menu; or select the user row and click “Modify Selected User” on the Task Panel, or click Setup on the Toolbar. The following window displays for the selected user.

**Tip:** Select “Never” to have the password never expire.

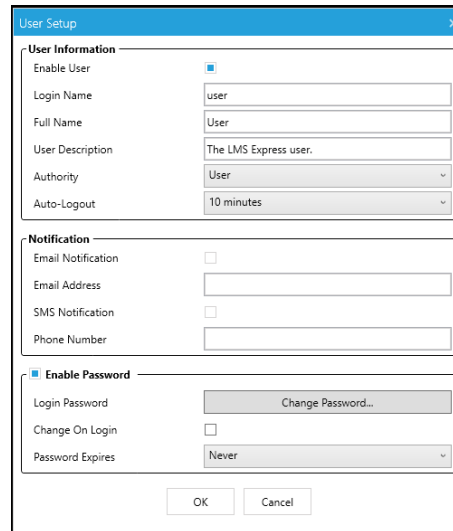
The 'User Setup' dialog box is divided into three sections. The 'User Information' section at the top includes a checked 'Enable User' checkbox, and text boxes for 'Login Name' (containing 'user'), 'Full Name' (containing 'User'), 'User Description' (containing 'The LMS Express user.'), 'Authority' (a dropdown menu showing 'User'), and 'Auto-Logout' (a dropdown menu showing '10 minutes'). The 'Notification' section in the middle has checkboxes for 'Email Notification' and 'SMS Notification' (both unchecked), and text boxes for 'Email Address' and 'Phone Number'. The 'Enable Password' section at the bottom has a checked checkbox, a 'Login Password' field with a 'Change Password...' button, an unchecked 'Change On Login' checkbox, and a 'Password Expires' dropdown menu set to 'Never'. 'OK' and 'Cancel' buttons are at the bottom.

Figure 9-22 Modify an existing user, Setup User Screen

When a password expires and the user next logs into **Express**, the user will see the following Setup Password window:

The 'Setup Password' dialog box has a blue title bar and a message area that reads 'Your password has expired. Please enter a new password.' Below the message are two text boxes labeled 'Password :' and 'Confirm :'. At the bottom are 'OK' and 'Cancel' buttons.

Figure 9-23 Expired Password Login

On the Setup Password window the user must change their password to a different password in order to log in.

When all of the user’s information has been entered, click OK to create the new user or Cancel to close the window without creating the account.



## Delete User

**Note:** The following accounts cannot be deleted: the Administrator\* account and the account that is currently logged in.

To delete a user, power user, or administrator, right click on the user account and select Delete from the pop up menu, or select a user account in the User Accounts view and click the Delete button on the toolbar, or click “Delete Selected User” on the Task Panel.

When an account is deleted, all the graphs, reports, data tables and other visualization features, like maps, owned by the account are also deleted.

## User Change Tracking

When an administrator adds, modifies or deletes a user account, a record documenting the change(s) is written into the Event Log. To view the Event Log, see the Event Log section of this chapter.

## User Logins

The User Logins section of the User Accounts Task Panel allows Administrators to enable and disable logins and user authentication.

The current status, if logins are enabled or disabled, is displayed on the User Logins section of the User Accounts Task Panel.



**Figure 9-24 User Logins - Enabled or Disabled Indicators**

Click on the Configure button to view and set the following user login options.

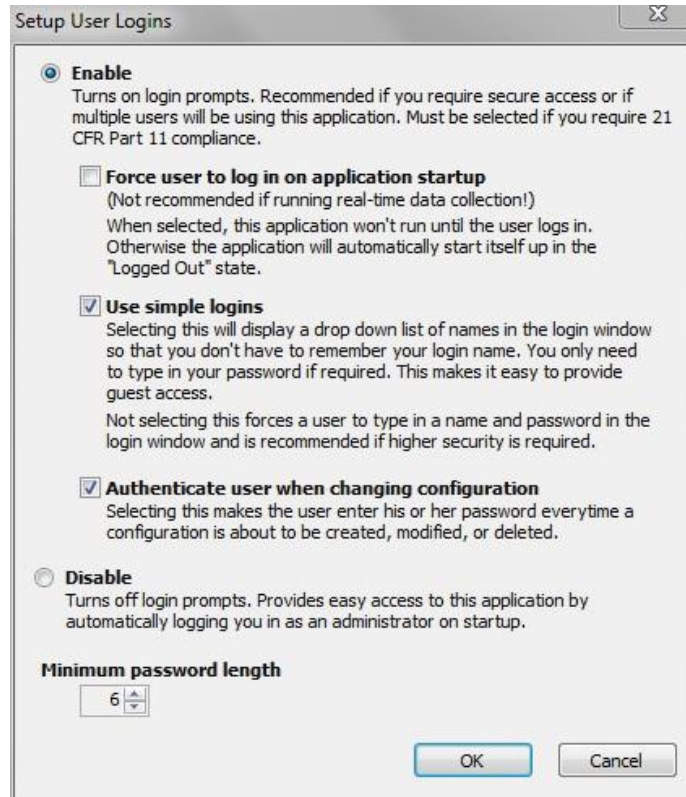


Figure 9-25 User Login Setup

## Disable

If User Logins are disabled when **Express** is started, the splash screen will display and immediately be followed by the main window.

## Enable

If Enable is selected but none of the options under Enable are checked (Force user to log in on application startup, Use Simple Logins, or Authenticate User when Changing Configuration), LMS Express starts up after it displays its splash screen and starts collecting real time data for LMS Express RT installations, but the user must login before he/she can display a private graph, data table, or standard report.

## Force User to Log in on Application Startup

When checked, **Express** will not run and will not collect data real time (if applicable) until the user logs in.

When started LMS Express displays the splash screen and then a login window.

**WARNING:** Force User to Login on Application Startup is not recommended if the user is collecting data real time.

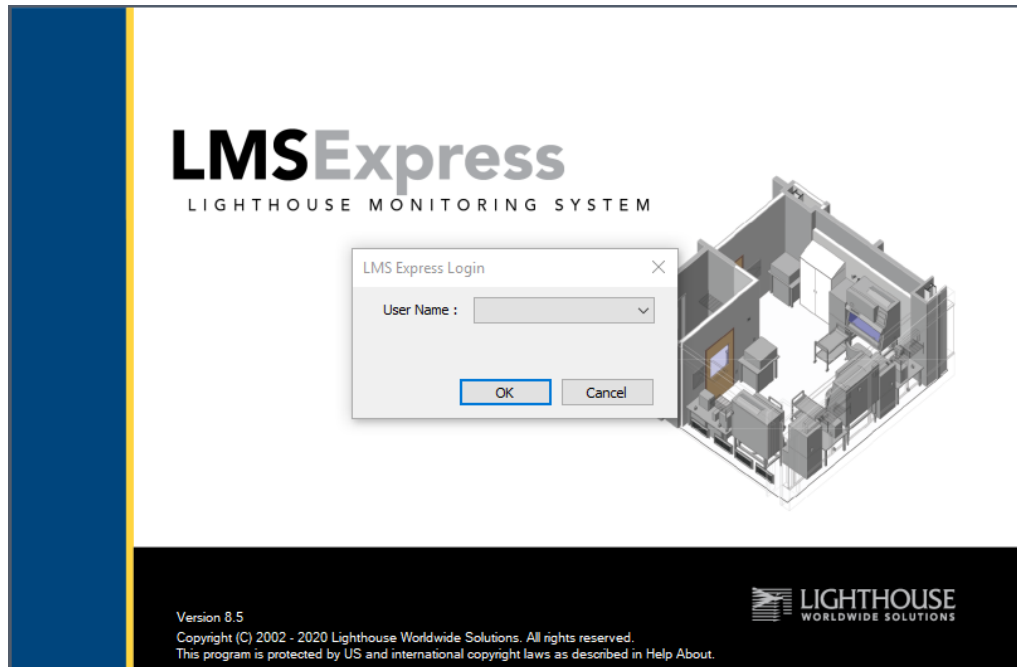


Figure 9-26 Login, Simple Logins

## Use Simple Logins

Checking Use Simple Logins displays a drop-down list of names on the login window so that the user can just pick their name from the list.

If a password is required for the account, a password field will appear after the user account is selected. Not checking Use Simple Logins forces the user to type in the user name (and password if it is also required). Not checking Use Simple Logins is recommended if a higher level of security is desired.

**Note:** Enable Login must be checked before "Required on Startup" can take effect.

**Note:** *The user gets three attempts to enter the correct password to authenticate changes to the system. If he/she fails, after the third time the window closes and a message is written to the event log.*

## Authenticate User when Changing Configuration

Checking this option forces the user to enter his or her password every time the user attempts to create, modify or delete configuration and configuration settings. Configuration and configuration settings includes graphs, data tables, standard reports, systems options and real time data collection.



Figure 9-27 User Authentication Window

## Minimum Password Length

The administrator can configure the minimum password length needed using this parameter.

## Notifications

LMS Express can send email notifications to users when sensors in the system are in alarm. Users who are configured to receive notifications will receive emails and/or SMS messages on all alarms or warnings that are set up in the system when they occur. To setup notifications, configure information for the email server and/or SMS server.

From the User Accounts screen select “Set up Email Notifications”.

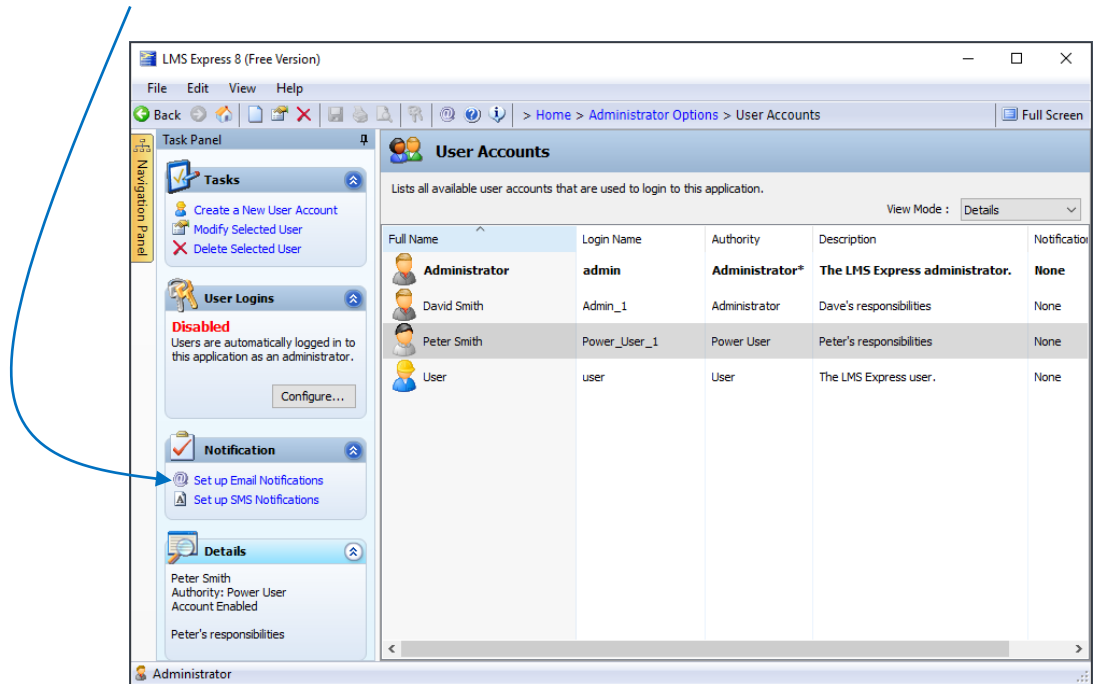
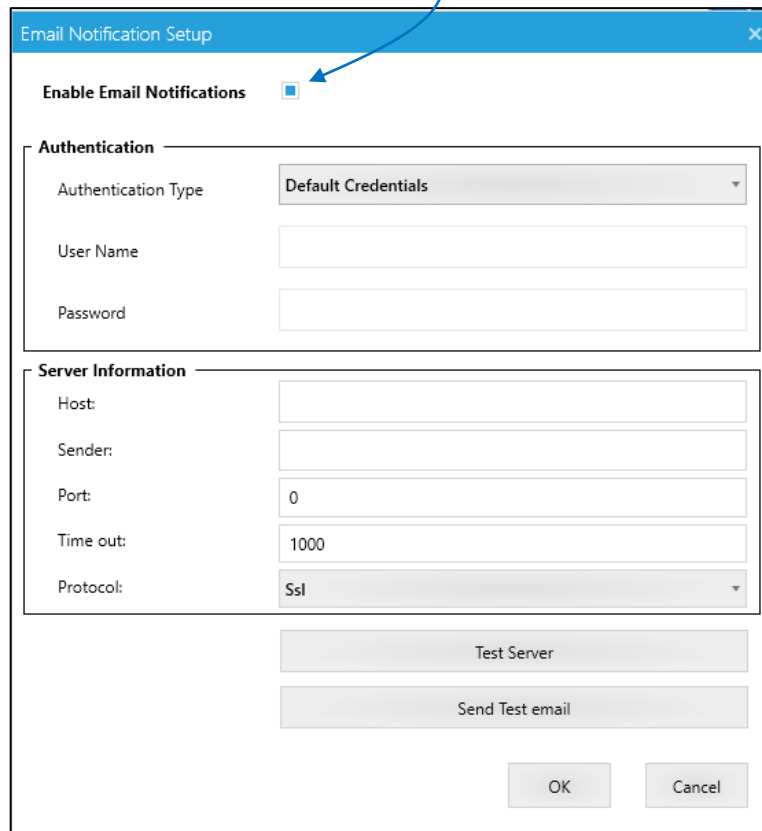


Figure 9-28 User Accounts

## Set up Email Notifications

Enable Email Notifications: Click on the check box to enable email notification.



The image shows a dialog box titled "Email Notification Setup". At the top, there is a checkbox labeled "Enable Email Notifications" which is currently unchecked. A blue arrow points to this checkbox from the text above. Below this, there are two main sections: "Authentication" and "Server Information". The "Authentication" section contains a dropdown menu for "Authentication Type" (set to "Default Credentials"), and text input fields for "User Name" and "Password". The "Server Information" section contains text input fields for "Host", "Sender", "Port" (set to "0"), "Time out" (set to "1000"), and a dropdown menu for "Protocol" (set to "Ssl"). At the bottom of the dialog, there are two buttons: "Test Server" and "Send Test email". At the very bottom right, there are "OK" and "Cancel" buttons.

Figure 9-29 Email Notification Setup

Select the Authentication Type

<i>Base 64 Encoding</i>	64 bit encoding of the username and password
<i>Plain Text</i>	No encoding of username and password
<i>Default Credentials</i>	No authentication, no username or password

Enter User Name

Enter Password

Enter the Host

Enter the Sender

Enter the Port

Enter the Timeout in milliseconds.

Select Protocol

## **LMS Express SMTP Client Configurations**

### **SMTP**

Simple Mail Transfer Protocol (SMTP) has both secure and unsecure operations to send emails to a SMTP server. A secure SMTP message provides protection at each point the message is transferred in its process. Unsecured email clients simply relay information without any protect in transit or storing on servers.

### **SSL/TLS**

Secure Socket Layer (SSL) and Transport Layer Security (TLS), are protocols to encrypt SMTP emails. TLS is the successor to SSL and the terms SSL and TLS are used interchangeably unless referring to a specific version.

### **START TLS**

START TLS is a way to take an existing insecure connection and upgrade it to a secure connection using SSL/TLS.

### **Connecting to SSL/TLS**

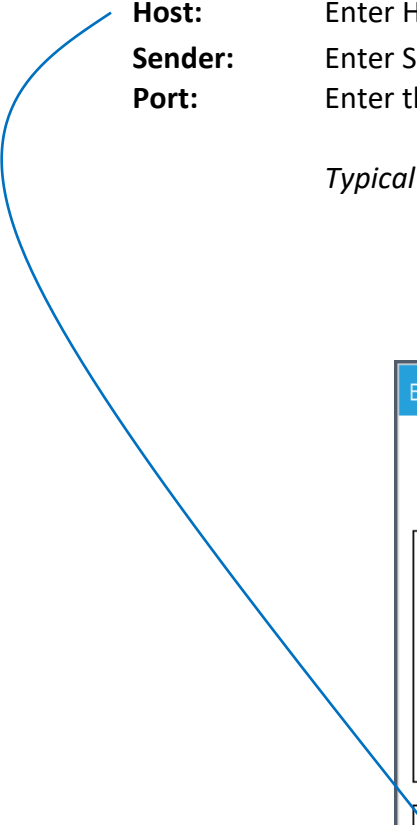
When connecting to an SSL/TLS encrypted port or use STARTTLS, both sides will negotiate which protocol and which version to use. Support for SSL/TLS is universal today, however which version is supported can be changed. As of May 2018, SSL v2 and SSL v3 were deprecated and have been phased out due to security issues. Most software supports TLS v1.0, v1.1, and 1.2.

## Server Information

**Host:** Enter Host URL or the IP Address of the SMTP Server  
**Sender:** Enter Sender e-mail address (example: [client@domain.com](mailto:client@domain.com))  
**Port:** Enter the SMTP Port for the server

### *Typical ports for SMTP*

Non-Secure: 25  
SSL/TLS: 465  
STARTTLS: 587



**Email Notification Setup** [X]

**Enable Email Notifications** ☐

**Authentication**

Authentication Type: Base 64

User Name:

Password:

**Server Information**

Host:

Sender:

Port:

Time out:

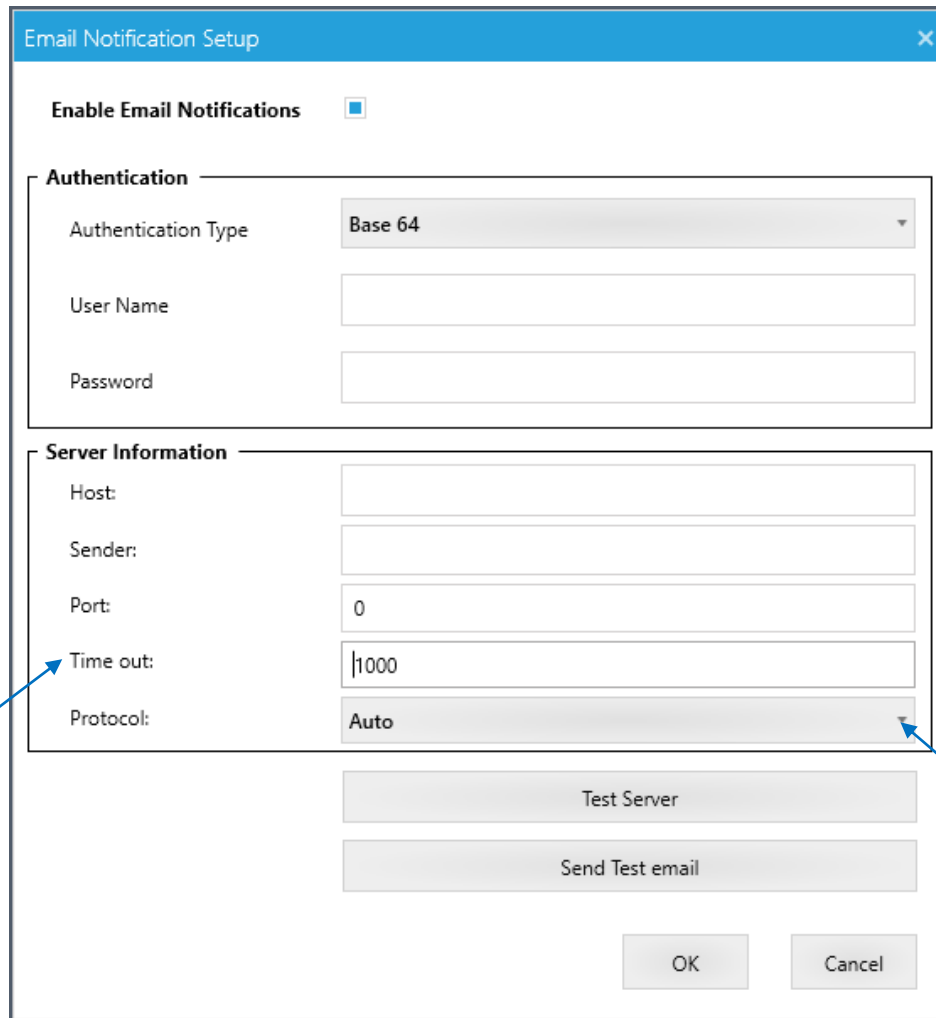
Protocol: Auto

Test Server

Send Test email

OK Cancel





The image shows a dialog box titled "Email Notification Setup" with a close button (X) in the top right corner. It contains two main sections: "Authentication" and "Server Information".

**Authentication Section:**

- Enable Email Notifications:** A checkbox that is currently unchecked.
- Authentication Type:** A dropdown menu set to "Base 64".
- User Name:** An empty text input field.
- Password:** An empty text input field.

**Server Information Section:**

- Host:** An empty text input field.
- Sender:** An empty text input field.
- Port:** A text input field containing "0".
- Time out:** A text input field containing "1000". A blue arrow points from the "Timeout:" label below to this field.
- Protocol:** A dropdown menu set to "Auto". A blue arrow points from the "Protocol:" label below to this dropdown.

At the bottom of the "Server Information" section are two buttons: "Test Server" and "Send Test email". At the very bottom of the dialog box are "OK" and "Cancel" buttons.

**Timeout:** Enter the Server Reply Timeout setting in seconds.

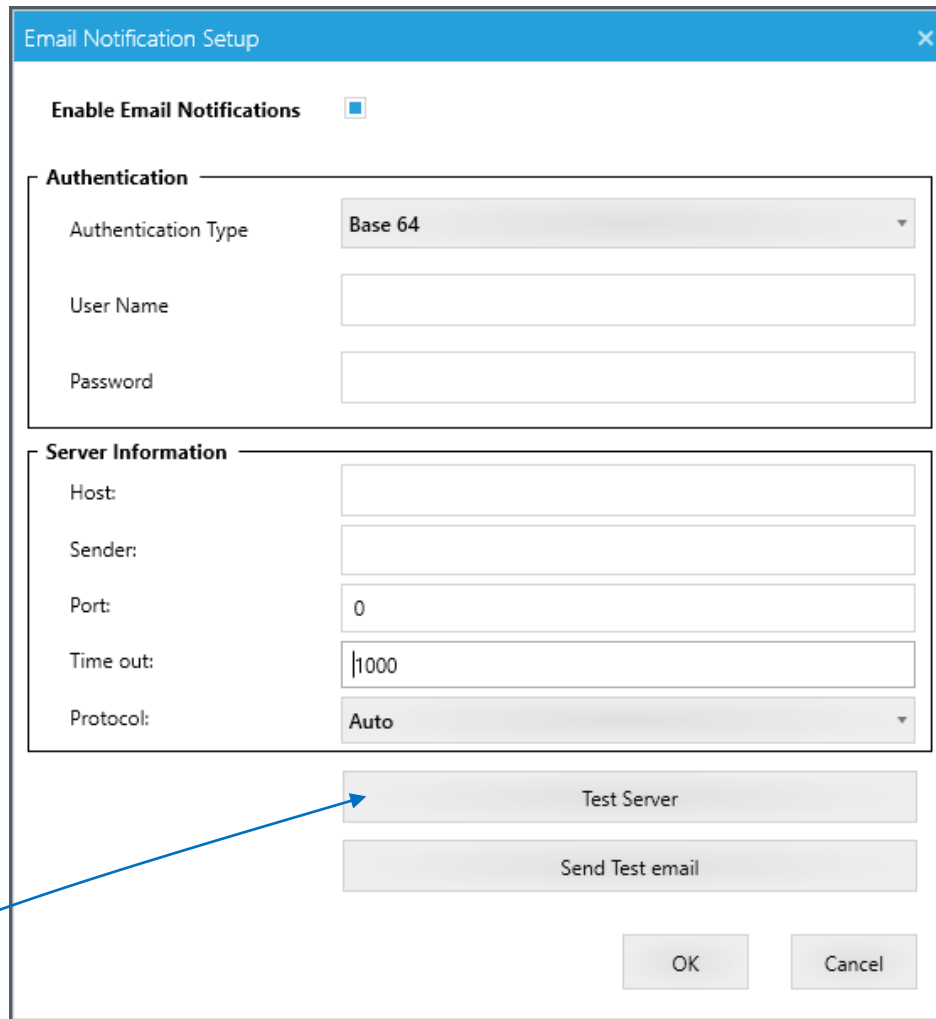
**Protocol:** Select the Protocol

**SSL** – Secure Socket Layer: Application-layer protocol for encrypt emails in transit. SSL supports older versions of protocol Version 2.0, 3.0 (Note: Legacy protocol)

**TLS** – Transport Layer Security: Application-Layer protocol for encrypting emails in transit. TLS supports the latest versions of protocol; versions 1.1, 1.2 and 1.3. (Note: Preferred protocol)

**Auto** – Auto negotiates encryption protocol with the Server

**None** – No Encryption

**Server Information** *continued*

The dialog box is titled "Email Notification Setup" with a close button (X) in the top right corner. It contains the following sections and controls:

- Enable Email Notifications:** A checkbox that is currently unchecked.
- Authentication:** A section with three fields:
  - Authentication Type:** A dropdown menu showing "Base 64".
  - User Name:** An empty text input field.
  - Password:** An empty text input field.
- Server Information:** A section with five fields:
  - Host:** An empty text input field.
  - Sender:** An empty text input field.
  - Port:** A text input field containing the value "0".
  - Time out:** A text input field containing the value "1000".
  - Protocol:** A dropdown menu showing "Auto".
- Buttons:** Two buttons, "Test Server" and "Send Test email", are positioned below the Server Information section. At the bottom right are "OK" and "Cancel" buttons.

A blue arrow points from the "Test Server" button to the text block below.

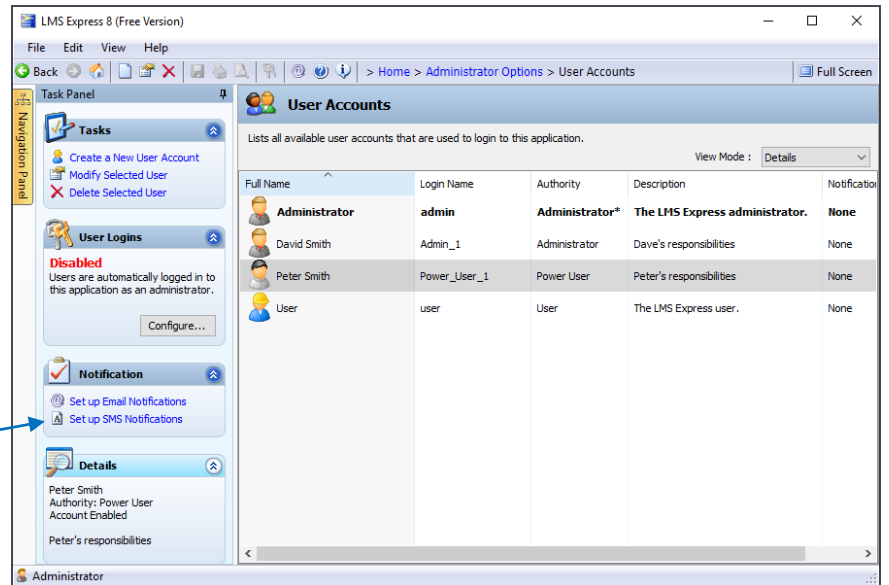
**Test Server:** Press the Test Server button and LMS Express will check to see if your settings are correct to handshake with the SMTP server.

**Send Test Email:** Press the Send Test email button and LMS Express will prompt for a recipient email and send a test email to that address.

**Save Setup:** Press OK to save Authentication and Server Information.

## Set up SMS Notifications

Select Set up SMS Notifications



### Enable Twilio SMS Notification

Click on the check box to Enable Twilio SMS Notification (*Requires a Twilio SMS provider subscription to use, not provided by Lighthouse Worldwide Solutions*).

Enter **Account SID**

Enter **Authorization Token**

Enter **Assigned Phone Number**

Click OK to save SMS Notification Setup or click on Cancel to cancel.

The 'SMS Notification Setup' dialog box is shown. It has a title bar with standard window controls. The main content area contains a checkbox labeled 'Twilio SMS Notification Enable' which is checked. Below this are three text input fields labeled 'Account SID', 'Auth Token', and 'Assigned Phone Number'. At the bottom of the dialog are two buttons: 'OK' and 'Cancel'. A blue arrow points from the text 'Click on the check box to Enable Twilio SMS Notification' to the checked checkbox.

Figure 9-30 SMS Notification Setup

## Instruments

When **Express** downloads data from an instrument, it downloads the instrument's model name, serial number and firmware version number as well. Information about all instruments from which data has been downloaded is displayed on the Instruments view.

## Viewing Instruments

To display the list of instruments, click on “Name Instruments and View their Details” in the Administrator Options view.



The Instruments view displays.



Figure 9-31 Instruments View

The information on the Instruments view can be displayed in detail mode or in icon view. Select a view from the View Mode pulldown list.

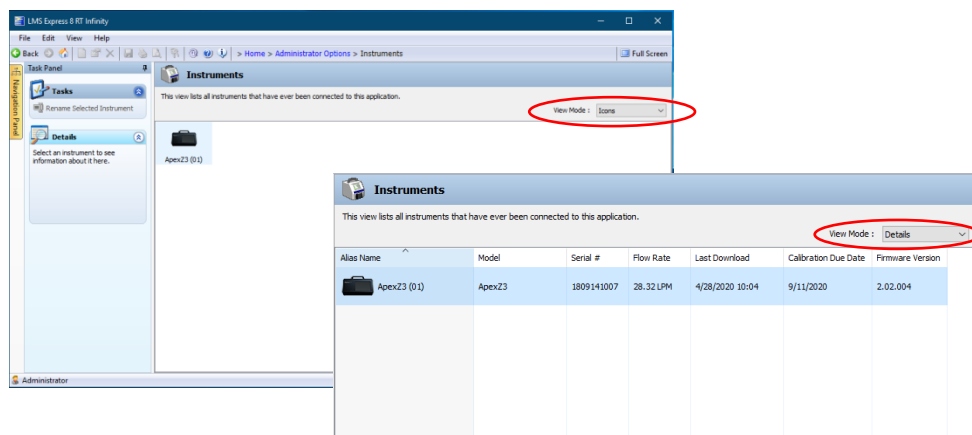


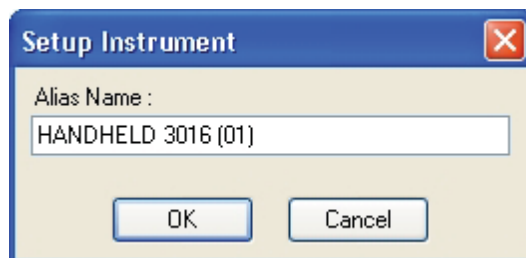
Figure 9-32 Detail and Icons View - Instrument View

## Changing an Instrument's name

By default the model number and name of the instrument is assigned as the “Name” of the instrument. To help users more easily identify each instrument, the instrument name can be changed to a different alias after the download is complete, or after data is collected real time.

To change the name of the instrument, select the instrument on the list of instruments displayed on the **Express** Instruments page and double click on it, click the setup button on the toolbar, or click Rename Selected Instrument. on the Task Panel.

The Setup Instrument window appears.



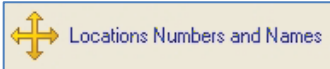
**Figure 9-33 Setup Instrument Name**

Enter a new name for the instrument in the Alias Name field and click the OK button.

The new name appears in **Express** views, setup windows and where ever the user can select or display an instrument name.

## Locations

### Viewing Locations



To display information about Location(s) where the data was collected, click on “Location Numbers and Names” in the Administrator Options view.

Locations			
Valid for Portables	Number	Short Name	Long Name
<input checked="" type="checkbox"/>	1	LOC001	Location 001
<input checked="" type="checkbox"/>	2	LOC002	Location 002
<input checked="" type="checkbox"/>	3	LOC003	Location 003
<input checked="" type="checkbox"/>	4	LOC004	Location 004
<input checked="" type="checkbox"/>	5	LOC005	Location 005
<input checked="" type="checkbox"/>	6	LOC006	Location 006
<input checked="" type="checkbox"/>	7	LOC007	Location 007
<input checked="" type="checkbox"/>	8	LOC008	Location 008
<input checked="" type="checkbox"/>	9	LOC009	Location 009
<input checked="" type="checkbox"/>	10	LOC010	Location 010
<input checked="" type="checkbox"/>	11	LOC011	Location 011
<input checked="" type="checkbox"/>	12	LOC012	Location 012
<input checked="" type="checkbox"/>	13	LOC013	Location 013
<input checked="" type="checkbox"/>	14	LOC014	Location 014
<input checked="" type="checkbox"/>	15	LOC015	Location 015
<input type="checkbox"/>	16	LOC016	Location 016
<input type="checkbox"/>	17	LOC017	Location 017
<input type="checkbox"/>	18	LOC018	Location 018
<input type="checkbox"/>	19	LOC019	Location 019
<input type="checkbox"/>	20	LOC020	Location 020

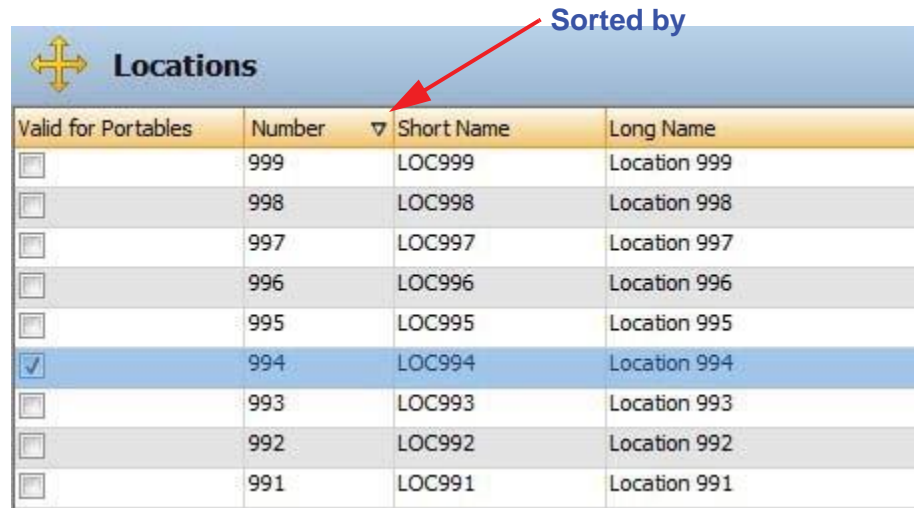
Figure 9-34 Locations View

**Note:** If the cleanroom has multiple Lighthouse instruments, it would be good to map out the locations to specific location numbers within each instrument before readings are taken. That way location can be properly associated with data in case more than one instrument is run in the same location.

Initially **Express** assigns each location a default location name like “LOCXXX” where “XXX” is the location’s number.

**Express** contains up to 999 locations.

The Location view can be sorted in ascending or descending order by clicking on the Number, Short Name, or Long Name column headers. Clicking the same column header twice will cause the Location view to sort in the opposite direction. An arrow on the column heading will show which column is sorted and which direction it is sorted. To enable a location for portables when getting buffered data while sampling, select the checkbox for the location number.



**Sorted by**

Valid for Portables	Number	Short Name	Long Name
<input type="checkbox"/>	999	LOC999	Location 999
<input type="checkbox"/>	998	LOC998	Location 998
<input type="checkbox"/>	997	LOC997	Location 997
<input type="checkbox"/>	996	LOC996	Location 996
<input type="checkbox"/>	995	LOC995	Location 995
<input checked="" type="checkbox"/>	994	LOC994	Location 994
<input type="checkbox"/>	993	LOC993	Location 993
<input type="checkbox"/>	992	LOC992	Location 992
<input type="checkbox"/>	991	LOC991	Location 991

**Figure 9-35 Locations, Sorted by Number, Descending Order**

## Changing Location Name

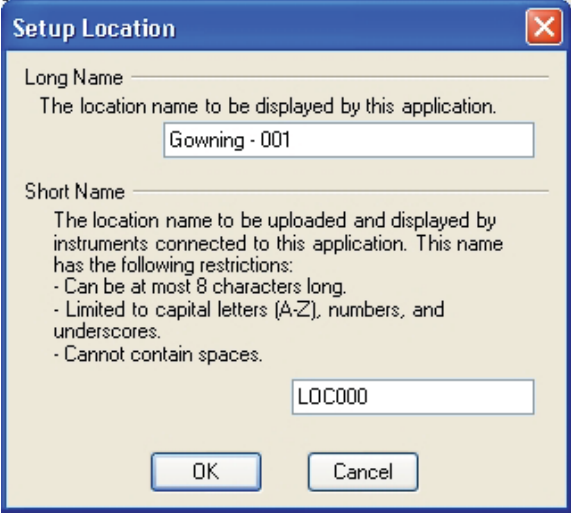
To change the name of the location, select the location.



Valid for Portables	Number	Short Name	Long Name
<input checked="" type="checkbox"/>	1	LOC001	Location 001
<input checked="" type="checkbox"/>	2	LOC002	Location 002
<input checked="" type="checkbox"/>	3	LOC003	Location 003
<input checked="" type="checkbox"/>	4	LOC004	Location 004
<input checked="" type="checkbox"/>	5	LOC005	Location 005
<input checked="" type="checkbox"/>	6	LOC006	Location 006
<input checked="" type="checkbox"/>	7	LOC007	Location 007
<input checked="" type="checkbox"/>	8	LOC008	Location 008
<input checked="" type="checkbox"/>	9	LOC009	Location 009
<input checked="" type="checkbox"/>	10	LOC010	Location 010
<input checked="" type="checkbox"/>	11	LOC011	Location 011
<input checked="" type="checkbox"/>	12	LOC012	Location 012

**Figure 9-36 Changing Location Name - Select Row**

Double click on the location, click on the setup button on the toolbar, or click “Edit Selected Location” on the Task Panel on the left side of the Locations view. The following Setup Location dialog box appears.

A screenshot of a Windows-style dialog box titled "Setup Location". It has a blue title bar with a red "X" button in the top right corner. The dialog is divided into two sections. The first section is labeled "Long Name" and contains the text "The location name to be displayed by this application." followed by a text input field containing "Gowning - 001". The second section is labeled "Short Name" and contains the text "The location name to be uploaded and displayed by instruments connected to this application. This name has the following restrictions:" followed by a bulleted list: "- Can be at most 8 characters long.", "- Limited to capital letters (A-Z), numbers, and underscores.", and "- Cannot contain spaces." Below the list is a text input field containing "LOC000". At the bottom of the dialog are two buttons: "OK" and "Cancel".

**Figure 9-37 Setup Location Name**

On the Setup Location window, enter a new long and short name for the location and click OK.

The long location name will be maintained and displayed by **Express** only. The short name can be uploaded and displayed on the instrument(s) connected to **Express**.

- Location Long and Short Names must be unique.
- Location Short Names have the following additional restrictions:
  - Cannot be greater than 8 characters long
  - Can only include capital letters (A-Z), numbers and underscores.
  - Cannot contain spaces or special characters (\*, \$, !, @).

### **Saving Locations to File**

Users can export the list of Locations to a Microsoft Excel file (\*.xls) or comma separated file (\*.csv). To export locations,

1. Display the Locations view.
2. Click on the Save As button on the tool bar or Save Locations to File on the Task Panel.
3. On the Save As window that appears, select the file type to save to (\*.xls or \*.csv).



4. Use the navigation tools at the top of the dialog box to select the directory to save the file.
5. Enter a name in the "File Name" field
6. Press Save. The file created can be viewed using the appropriate application(s).

## Printing Locations

Users can print the list of Location(s) as follows.

1. View Locations.
2. Print Preview
3. Click on the Print button on the toolbar, or Print Locations on the Task Panel.
4. On the default print window that appears, select the desired printer and click OK.
- 5.

## Upload Location Names to Instrument

**Note:** To upload location names to instrument(s), login as an administrator.

Users can upload location names from **Express** to Lighthouse Worldwide Solutions instruments that support alphanumeric location names. To start uploading location names, click "Upload Location Names to Instrument" on the Task Panel when the Locations View is displayed.



Figure 9-38 Location Names Upload Wizard

Click Next to continue.

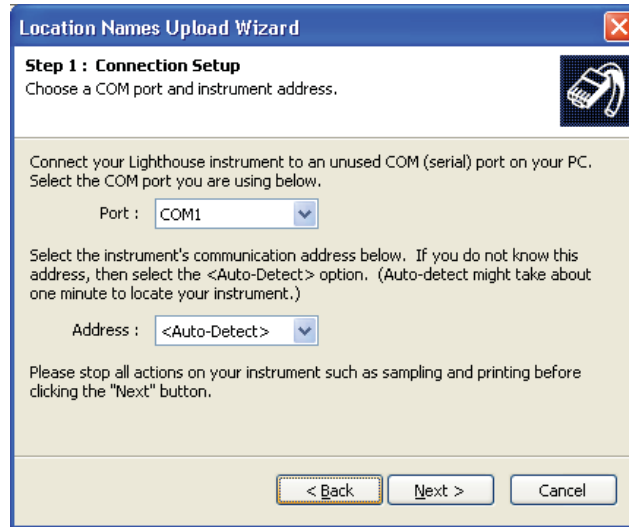


Figure 9-39 Upload Step 1

**Note:** By default the last used COM Port and Address used to upload location names or download data will be selected.

Select the COM Port and Address to search for the instrument. Just like downloading data from an instrument, users can choose “Auto-Detect” as the address and have **Express** automatically search for the instrument’s address.

Click Next to continue, or Prev to return to the previous Wizard step.

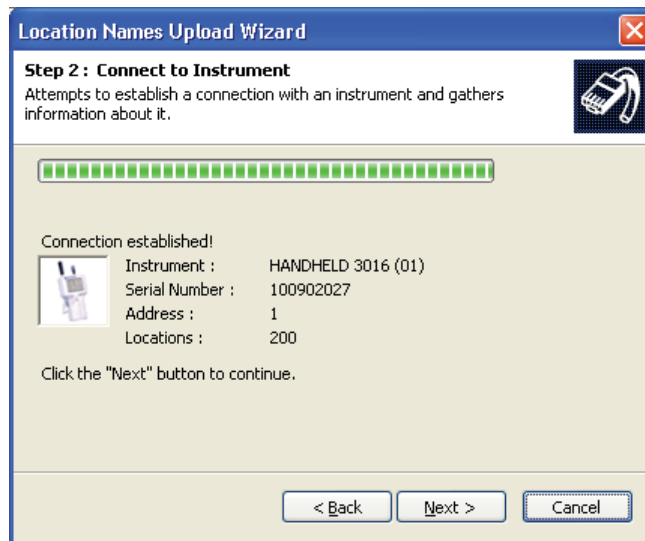
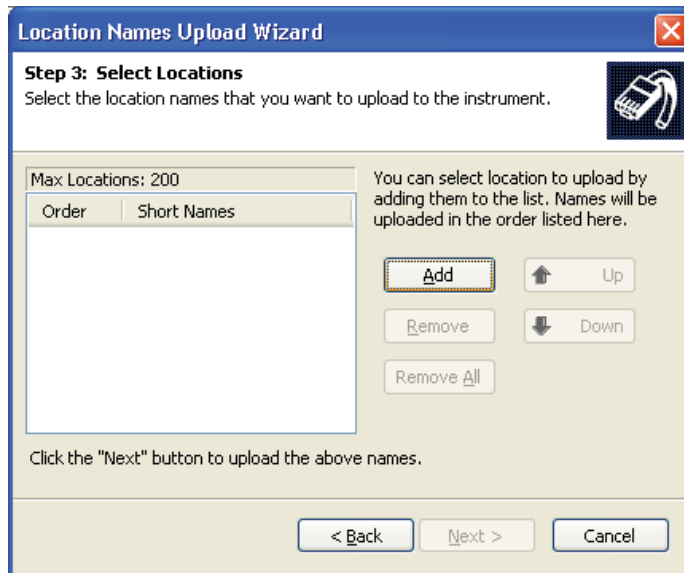


Figure 9-40 Upload Step 2

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

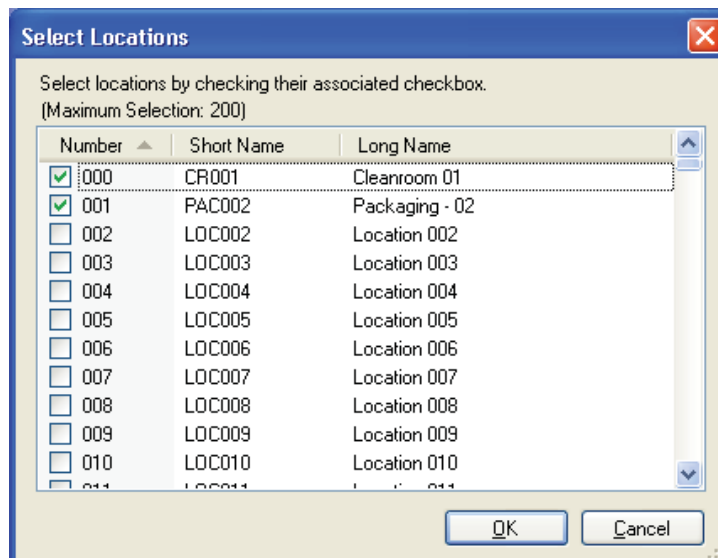
To select specific location names to upload, click Next.

**Note:** To change the list's sort order, click the column header.



**Figure 9-41 Upload Step 3**

Click the Add button and select the location names from those shown (Figure 9-39). To sort the list, click the header desired (such as, sort by long name ascending or descending order).



**Figure 9-42 Add Locations Screen**

**Note:** The maximum number of locations depends on the connected instrument.

**Express** can upload up to the maximum number of alphanumeric names the connected instrument supports, which is typically 200. After selecting all the location names to upload, click the OK button.

**WARNING:** Uploading location names overwrites any existing location names on the instrument.

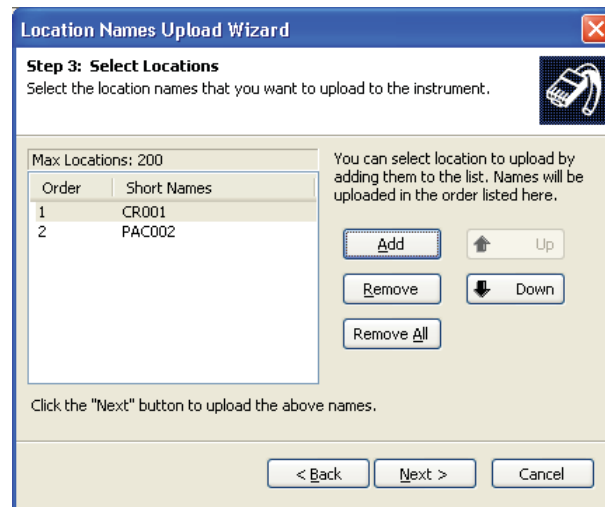


Figure 9-43 Upload Step 3 Continuing

To remove a location name, select it and click the Remove button. Click the Remove All button to remove all selected names.

To change the order of the location names, select a given name and click the up or down arrow button. Click the Next button and **Express** begins uploading. Figure 9-44 shows the successful upload.

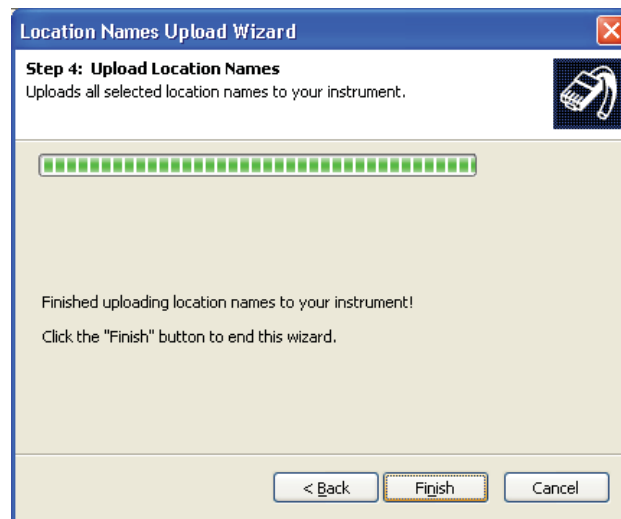


Figure 9-44 Upload Successful

When the upload is complete, click "Finish" to exit the Wizard.

## Event Log



The event log keeps track of all changes and events that occur in **Express** including the date and time the event occurred, the type of event, who triggered the event and possibly a detailed message.

The **Express** event log fulfills the audit trail requirement of 21 CFR part 11.

Event Log			
Date Time	User	Event	Message
7/5/2005 11:04:41	Administrator	Logout	
7/5/2005 11:04:42	System	Shutdown	
7/5/2005 11:04:58	System	Startup	
7/5/2005 11:05:57	System	Shutdown	
7/5/2005 11:07:28	System	Startup	
7/5/2005 11:07:30	System	Shutdown	
7/5/2005 11:07:39	System	Startup	
7/5/2005 11:08:36	Administrator	Login	
7/5/2005 11:08:52	System	Driver	[Serial Port 1\Address02] Instrument communications has been lost!
7/5/2005 11:08:54	System	Driver	[Serial Port 1\Address03] Instrument communications has been lost!
7/5/2005 11:08:56	System	Driver	[Serial Port 1\Address01] Instrument communications has been lost!
7/5/2005 11:16:35	Administrator	Modify	Enabled simple logins.
7/5/2005 11:16:37	Administrator	Logout	
7/5/2005 11:16:38	System	Shutdown	
7/5/2005 11:16:53	System	Startup	
7/5/2005 11:35:31	Administrator	Login	
7/5/2005 11:35:57	System	Driver	[Serial Port 1\Address02] Instrument communications has been lost!
7/5/2005 11:36:00	System	Driver	[Serial Port 1\Address03] Instrument communications has been lost!
7/5/2005 11:36:01	System	Driver	[Serial Port 1\Address01] Instrument communications has been lost!
7/5/2005 12:52:54	Administrator	Modify	Disabled logins on application startup.
7/5/2005 12:52:54	Administrator	Modify	Disabled simple logins.
7/5/2005 12:52:54	Administrator	Modify	Enabled user authentications.

Figure 9-45 Event Log view

**Tip:** When logins are enabled, the event log can only be accessed by administrators.

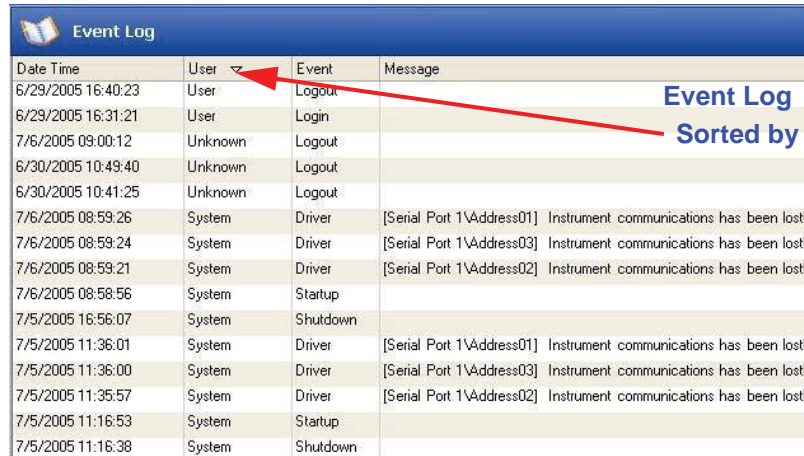
## Event Log

To view the event log, click the Administrator Options link in the Home view, then click "View the Event Log".

By default, the Event Log view displays all the log entries for the past week. When new log entries are added, **Express** appends the new log entries to the existing log in real time.

**Note:** Event Log entries longer than 255 characters will be split into multiple log entries and ellipsis “...” will be attached to the split messages.

The list of log entries can be sorted by clicking on one of the Event Log view column headers. Clicking the same column header will cause the column to sort in the opposite direction. An arrow on the column heading indicates which column is sorted and which direction it is sorted.



Date Time	User	Event	Message
6/29/2005 16:40:23	User	Logout	
6/29/2005 16:31:21	User	Login	
7/6/2005 09:00:12	Unknown	Logout	
6/30/2005 10:49:40	Unknown	Logout	
6/30/2005 10:41:25	Unknown	Logout	
7/6/2005 08:59:26	System	Driver	[Serial Port 1\Address01] Instrument communications has been lost!
7/6/2005 08:59:24	System	Driver	[Serial Port 1\Address03] Instrument communications has been lost!
7/6/2005 08:59:21	System	Driver	[Serial Port 1\Address02] Instrument communications has been lost!
7/6/2005 08:58:56	System	Startup	
7/5/2005 16:56:07	System	Shutdown	
7/5/2005 11:36:01	System	Driver	[Serial Port 1\Address01] Instrument communications has been lost!
7/5/2005 11:36:00	System	Driver	[Serial Port 1\Address03] Instrument communications has been lost!
7/5/2005 11:35:57	System	Driver	[Serial Port 1\Address02] Instrument communications has been lost!
7/5/2005 11:16:53	System	Startup	
7/5/2005 11:16:38	System	Shutdown	

**Figure 9-46 Log Window, Sorted by Column**

To look at a particular portion of the Event Log, click on the Setup button on the toolbar or Change Log's Time Period on the Task Panel.

The following window displays:



**Setup Event Log**

**Time Range**

☒ Rolling time range for viewing current log entries. Old entries are "rolled off" over time.

Duration Days : 7

Duration Time : 00:00:00

☐ Fixed time range for viewing past log entries.

Start : 6/29/2005 08:59:00

End : 7/ 6/2005 08:59:00

OK Cancel

**Figure 9-47 Setup Event Log Window**

On the Setup Log window, select a Time Range. If 'Rolling' is selected, enter a duration. The minimum duration is one minute and the maximum is 7 days. If 'Fixed' is selected, enter start and end date/ times.

After clicking OK. The event log view updates to reflect the new time range.

## Exporting Event Log

Users can save the Event Log to a Microsoft Excel (\*.xls) or comma separated (\*.csv) file.

1. View the Event Log.
2. Click on the Save As button on the toolbar or click Save to File on the Task Panel.
3. On the Save As window that appears, select the file type to save the event log to: \*.xls or \*.csv.
4. Use the navigation tools at the top of the dialog box to select a location to save the file to.
5. Enter a name in the "File Name" field.
6. Click Save.

The current Event Log view is saved to the specified file and can be viewed using the appropriate application(s).

## Printing Event Log

Users can print the Event Log as follows.

1. View the Event Log.
2. Print Preview: Users can preview the Event Log before printing the log.
3. Click on the Print button on the toolbar or click Print Log on the Task Panel.
4. On the Print window that appears, select the printer and click OK. The current Event Log view prints.

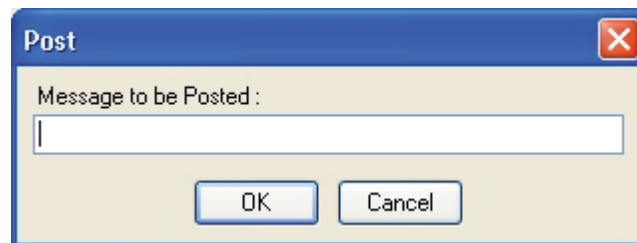
## Posting to the Event Log

**Note:** Only Administrators can access the Event Log.

Administrators can write (or “Post”) their own message(s) to the event log. To post a message, do the following:

1. Login as an administrator.
2. Display the Event Log
3. Click the toolbar’s New button or Post a Custom Message on the Task Panel.

The following dialog appears:



**Figure 9-48 Event Log Post Message window**

**Note:** Click Cancel to disregard any changes.

4. Type in at least 1 character for each message. Messages can be up to 255 characters long. Enter the message.
5. Click OK to post it to the event log.

**Note:** Individual log entries cannot be deleted!

The timestamp for the new log entry is the current date and time. Its event type is “Post”.



## Database Maintenance



**Note:** Ideally, backup all archives to USB key or CD's and store database off-site in the event of an emergency.

Without maintenance or attention, **Express'** database can continue to grow. As a result, database maintenance is an important part of running and managing **Express**. For instance, for faster performance displaying historical data, regularly archive old data.

Administrators can perform database maintenance tasks on the Database view. To access this view, login as an administrator, click the Home button, click Administrator Options and then click Database Maintenance and Archive Handling.

The following Database maintenance view displays:

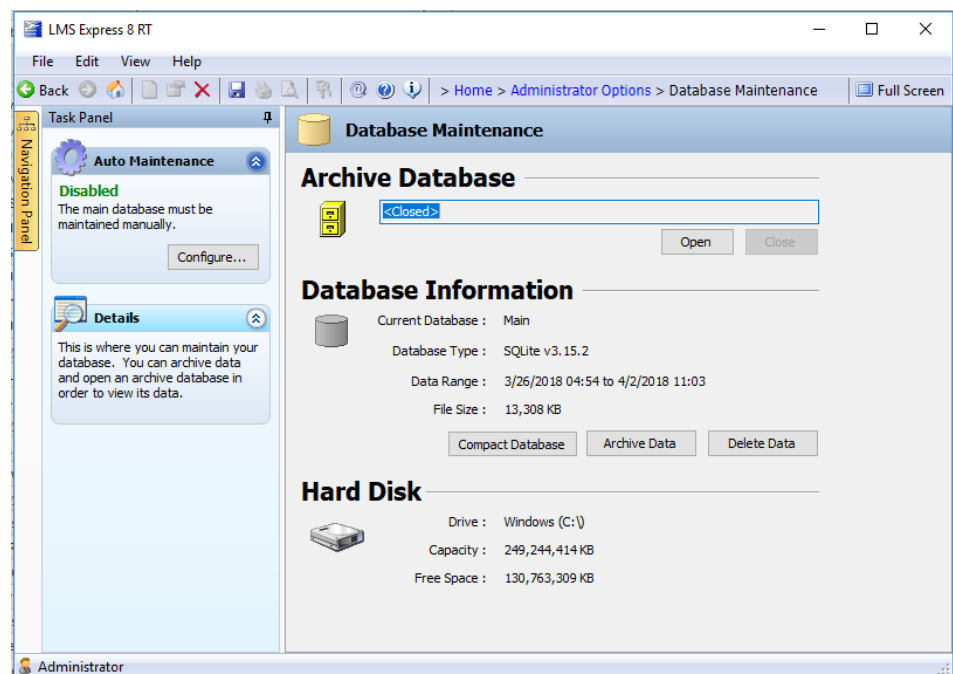


Figure 9-50 Database Maintenance

On the Database view administrators can see information about the available hard disk, the current database, as well as open archive databases, create archives and delete data.

## Archive Database

Users can view historical data by opening previously saved archive database files. Once the user has opened an archive file, he or she can print graphs, data tables or standard reports on the past data.

**Note:** *New data will only be recorded into the Main database.*

**Note:** *For information on how to archive data, see the Database Information's Archive Data feature, later in this manual.*

The Archive Database section of the Database view allows users to switch the **Express** from accessing data in **Express'** Main database to accessing data that was previously archived.



Figure 9-51 Archive Database information

**Express** archive files have extensions \*.da3. They only contain data points and data set information; however, data set information is ignored by **Express** and is only stored for recovery purposes.

**Note:** *Express v1.2 and greater differentiate between the Main database and the archive files. Users can't open a v1.2 (or greater) Main database as an archive file.*

Archive database files are dependent on the Main **Express** database for user and password configuration and information about data sets, instruments and locations.

To open an **Express** archive file, click the Open button underneath the Archive Database field.

The following Open window appears:

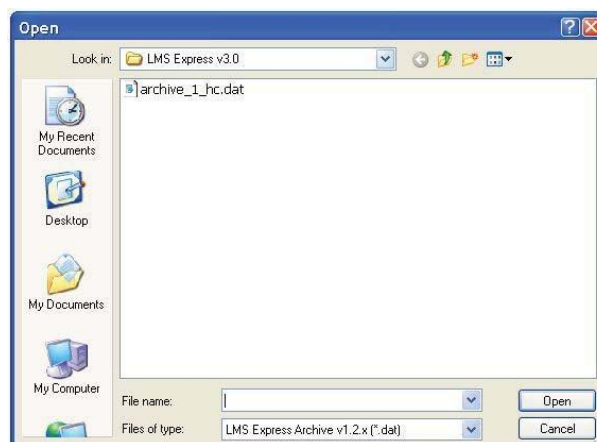


Figure 9-52 Open Archive file

**Note:** *Administrators can open previous Express version backup databases as archive files.*

Select an **Express** archive file and click Open. After Opening the archive database, the Archive Database field will show the path and file name of the archive.

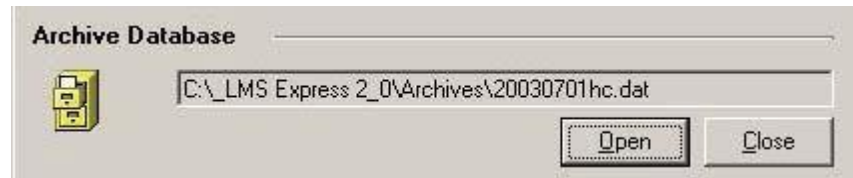


Figure 9-53 Open Archive database filename

And "Archive" appears on the status bar.



Figure 9-54 Archive Database open

## Database Information

The Database Information section of the Database view gives the user information about the current database and buttons to compact database, archive data and delete data.

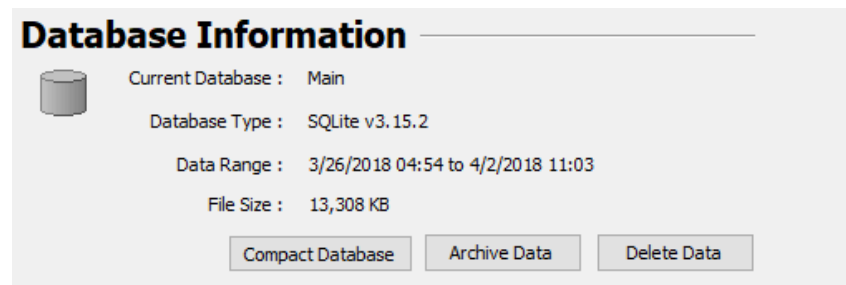


Figure 9-55 Database Information

## Compacting Database

Compacting the database regularly is a good database maintenance practice. When the Compact Database button is selected, a pop-up message is displayed asking whether to proceed or not. Selecting "Yes" will begin the compacting process. selecting "No" will cancel the action.

## Archiving Data

In order to save data for historical data review, regularly archive data. It is recommended that users create a naming convention so that they can later easily identify what data is in each archive file. It is also recommended that users create a specific location to store all archive databases so that they are easy to locate.

To archive data do the following:

1. Click on the Archive Data button.
2. On the Save As dialog box appears, go to the location to save the archive file.
3. Type a name for the archive file.
4. Click Save.

**Note:** The database file is password protected to prevent access any other software.

## Suggested Naming Convention for Archive Files

To construct a naming convention for archive files, first determine the data ranges regularly archived. This could be every month or every week or every two weeks, etc., depending on the administrator's needs.

A simple and easy naming convention includes using part of the date range of the data to uniquely identify the archive files. Using the date range of the data in the archive file name will also help ensure that the archive files remain in chronological order, making it easier to retrieve and review historical data.

For example, when archiving data for July 1 - 31, 2003, some possible archive file names include:

- 20030701 - to identify monthly data by first day of the month
- 20030701-31 - to identify by the days in the month range
- 20030701JL - to identify the first day of the month and include the initials of the user who ran the archive.

**Note:** After archiving data, it is recommended that the data that was just archived is deleted from the Main database. This will help keep the Main database at a manageable size (see the section on deleting data)

## Delete Data

**WARNING:** *Before deleting the data, run an archive to save the data for future use.*

*Once the data has been deleted, it cannot be retrieved.*

Periodically administrators need to delete data from the database in order to prevent the system's hard disk from overflowing.

1. Go to the Database window on the Setup shortcut bar.
2. Click on Delete Data. The following dialog box opens:



Figure 9-56 Delete Data dialog box

3. Select an option:
  - The "Delete data older than...<date>" option will delete all data timestamped before the selected date.
  - The "Delete all data points in storage" option will remove all data points in the database.
4. Click OK.
5. The following warning displays:



Figure 9-57 Delete Warning

- Click Yes to delete the data or No to cancel the delete. If Yes was clicked, the selected data is deleted and afterwards the following message appears:



Figure 9-58 Successful Deletion of Data

- Click OK to close the message.

## Automatic Database Maintenance

In addition to manual database maintenance, **Express** includes an automatic maintenance feature that can be set up to clear the database on a periodic basis.

To access this feature, login as an administrator, click the Home button, click Administrator Options and then click Database Maintenance.

The following Database Maintenance view displays:

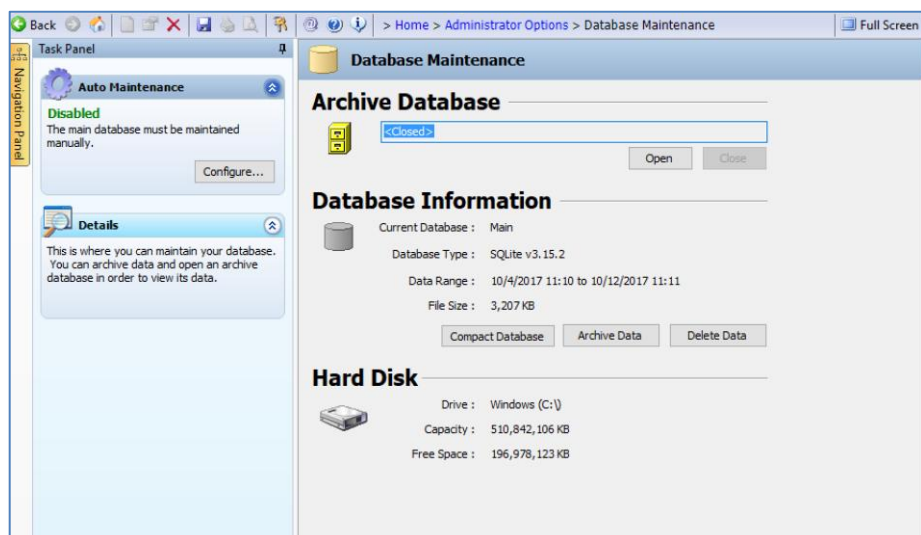


Figure 9-59 Database Maintenance

Click Configure in the Auto Maintenance portion of the screen. The following dialogue box appears:

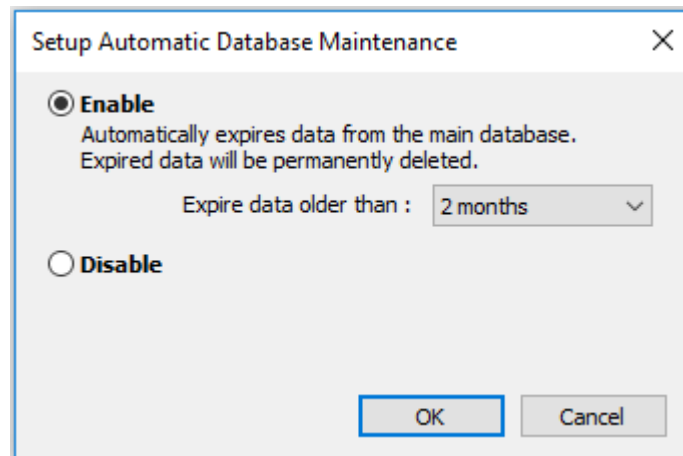


Figure 9-60 Setup Automatic Maintenance

The default setting is for Automatic Maintenance and Expire data older than 2 months. If you click the drop down for the time, you may choose from a number of options as shown in Figure 9-59.

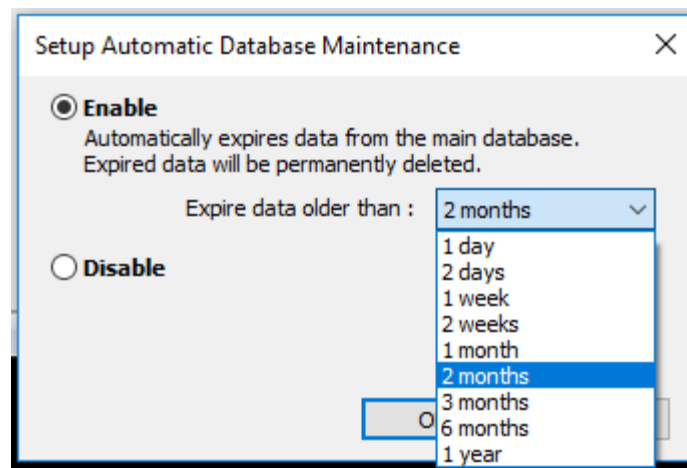


Figure 9-61 Drop Down List

The Expire setting means that data older than this value will be removed from the database automatically.

## Hard Disk

The Hard Disk section of the Database view gives the user information about the drive where the database is located. Specifics include the drive letter, capacity of the drive and amount of free space left on it. This helps the user monitor drive usage for the database and anticipate filling the available space on that drive.



**Figure 9-62 Hard Disk information**



# Chapter 10 Data Collection

## Downloading Data Manually

This chapter describes how to connect instruments and manually download their data. It also discusses configuration of both **Express** versions and how to set up **LMS Express RT** to collect real time data from connected instruments.

Each **Express** version has an auto-detect feature enabling the software to find a Lighthouse ApexP, ApexR, ApexZ, Handheld, Remote or Solair when the instrument is either connected to a configured COM port via an RS-232 cable, wired Ethernet, across Wi-Fi or connected with a micro USB cable to the ApexZ micro USB port.

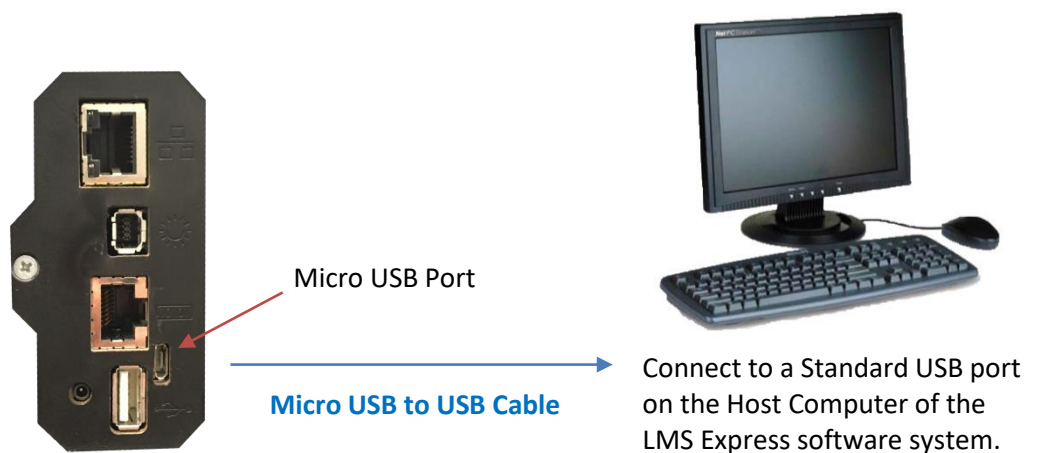
## ApexZ Serial Driver Install

ApexZ supports serial communications through the Micro USB port to download data into the LMS Express software system.

**Note:** Requires a Micro USB to Standard USB cable for Data.

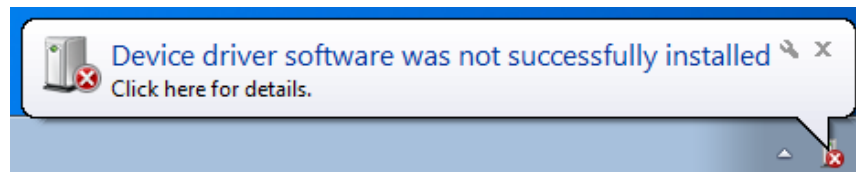
Connect the Micro USB cable end to the Apex Z Micro USB port, and connect the Standard USB cable end to any standard USB port on the local computer hosting the LMS Express software system.

**WARNING:** Some micro USB cables may only work for charging USB devices and not downloading data.



## Operating Systems

For Windows 7 SP1, Windows 8.1 and Windows Server 2012 users will need to update the driver software. When ApexZ is connected with the micro USB for these Operating Systems a notification message will appear in the system tray. This means your system needs to update the software driver. This driver is included in the LMS Express software folder system.



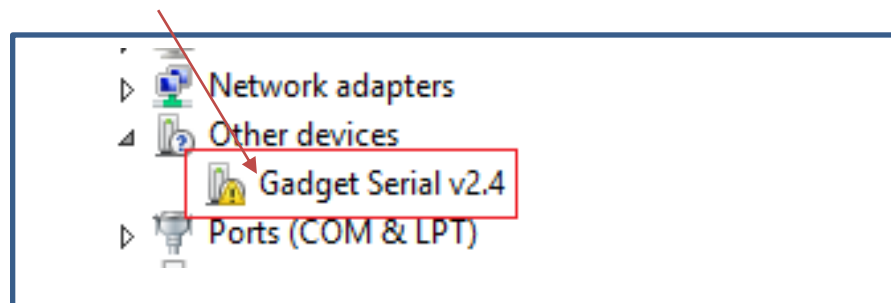
## Update Software Driver

On the Windows OS computer, go to **Device Manager**.

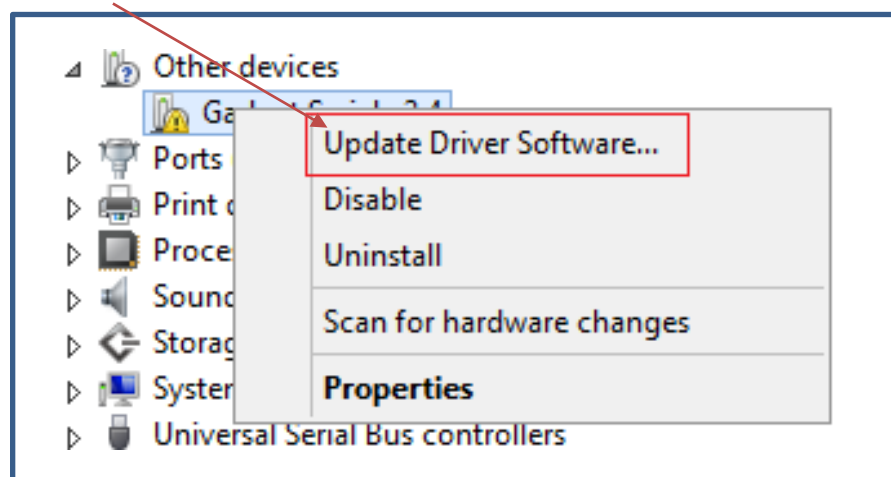
**Click** and open the Other devices folder.

You should see Gadget Serial v2.4 with a yellow error icon

**Right Click** on Gadget Serial v2.4



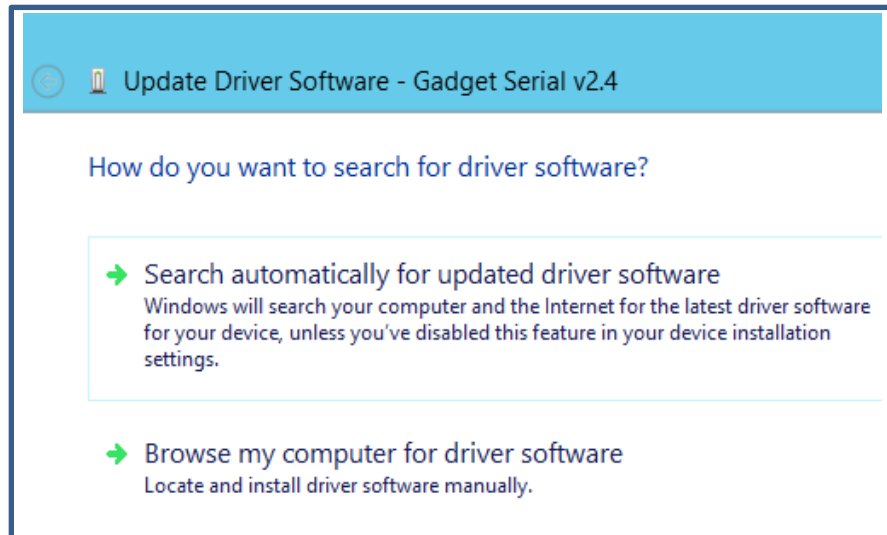
**Select** Update Driver Software



The User is presented two options to search for the driver software.

1. Search automatically for updated driver software.
2. Browse my computer for driver software.

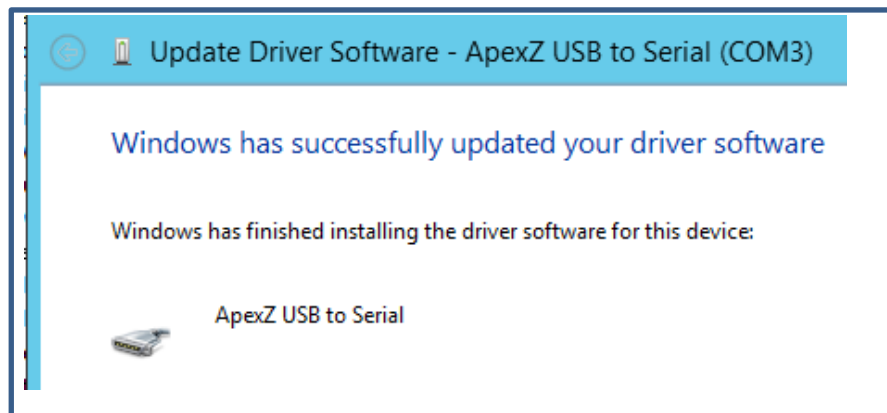
**Click:** "Browse my computer for Driver Software".



**Select:** C:\LMS Express 8 Directory,

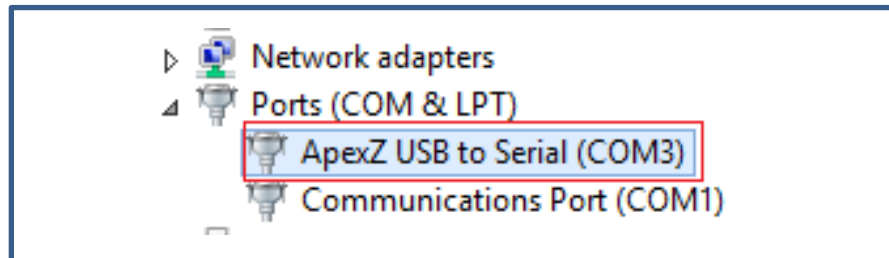
**Click NEXT.**

Displays Windows Security message-Confirmation before installation.



**Click Close**

Go to **Device Manager**: The Serial gadget v2.4 is now displayed under PORTS as “ApexZ to Serial(COM X)”. LMS Express will now recognize this driver and allow serial communication through the micro USB port.



**Note:** LMS Express automatically stops the instrument if it is counting when a user starts manually downloading data.

## Download Data from ApexZ Instruments

From the Home screen click on the ApexZ Quick Links, Manual Download button.

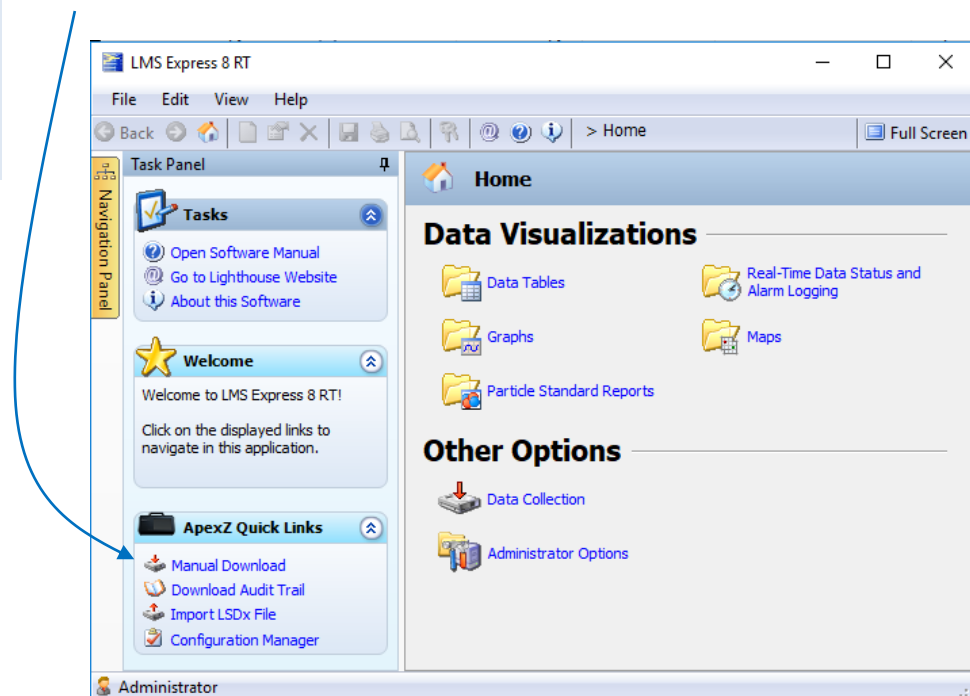


Figure 10-1 LMS Express Home Screen

**Note:** Auto Discovery of ApexZ instruments requires use of UDP port 8181.

LMS Express will auto discover ApexZ instruments connected to the same Network and display a list of Instruments and Models.

ApexZ Data Download						
Instrument Name	Model Name	Serial Number	Connection	Status	Firmware	User's Enabled
	ApexZ3	1608001001	10.10.3.47	IDLE	2.01.010	<input type="checkbox"/>
	ApexZ3	1608001039	10.10.3.39	SAMPLING	1.01.010	<input type="checkbox"/>
	ApexZ50	1608001001	10.10.3.43	IDLE	2.01.010	<input type="checkbox"/>
Z3 Pharma Demo	ApexZ3	1608001042	10.10.3.40	IDLE	2.01.010	<input type="checkbox"/>
	ApexZ3	1608001001	10.10.3.38	IDLE	2.01.010	<input type="checkbox"/>
Ben	ApexZ3	1608001001	10.10.3.48	IDLE	2.02.001	<input type="checkbox"/>
	ApexZ3	1608001001	10.10.3.46	IDLE	2.01.010	<input checked="" type="checkbox"/>
	ApexZ3	1608001001	10.10.3.44	IDLE	2.01.010	<input type="checkbox"/>
Firmware 2.00	ApexZ3	1608001001	10.10.3.42	IDLE	2.00.018	<input checked="" type="checkbox"/>
	ApexZ50	1608001041	10.10.3.41	IDLE	2.01.010	<input type="checkbox"/>
	ApexZ50	1709144008	10.10.2.126	IDLE	2.00.017	<input type="checkbox"/>
	ApexZ3	1705141008	10.10.2.168	IDLE	1.01.010	<input type="checkbox"/>

**Figure 10-2** AApxZ instruments detected on Network

Click on an ApexZ instrument and that instrument row will highlight grey indicating it has been selected. Next click the Select button

Alternatively you may click on the Find button and enter an IP address to connect to an ApexZ instrument.

Find an Apex... ×

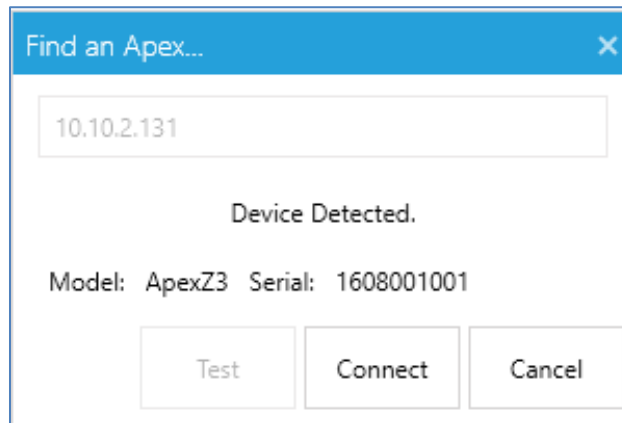
Status

**Figure 10-3** Enter IP address

After entering the IP address press the Test button to detect that the IP address is on the Network.

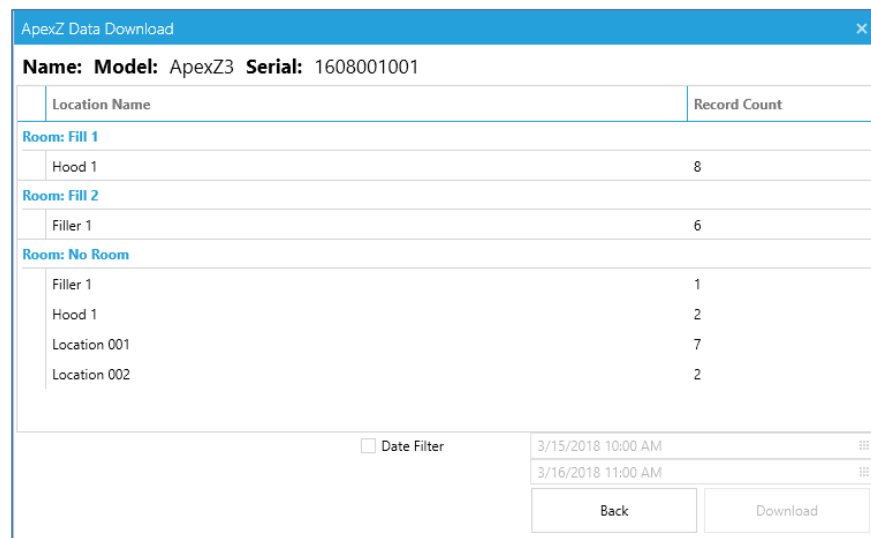
If your device is located at that IP address then that device will be

detected and displayed.



**Figure 10-4 Device Detected Connect**

Press the Connect button and LMS Express will retrieve data and display the Room, Location and Record Count.



**Figure 10-5 ApexZ data record display**

Select and highlight the data records you wish to manually download and press the Download button. While LMS Express is downloading the selected data records on screen message will display “Downloading Data...” at the bottom of the window. After download press Close.



## Download data from Lighthouse instruments.

From the Home screen press Data Collection button.

From the Data Collection screen press Manual Data Download.

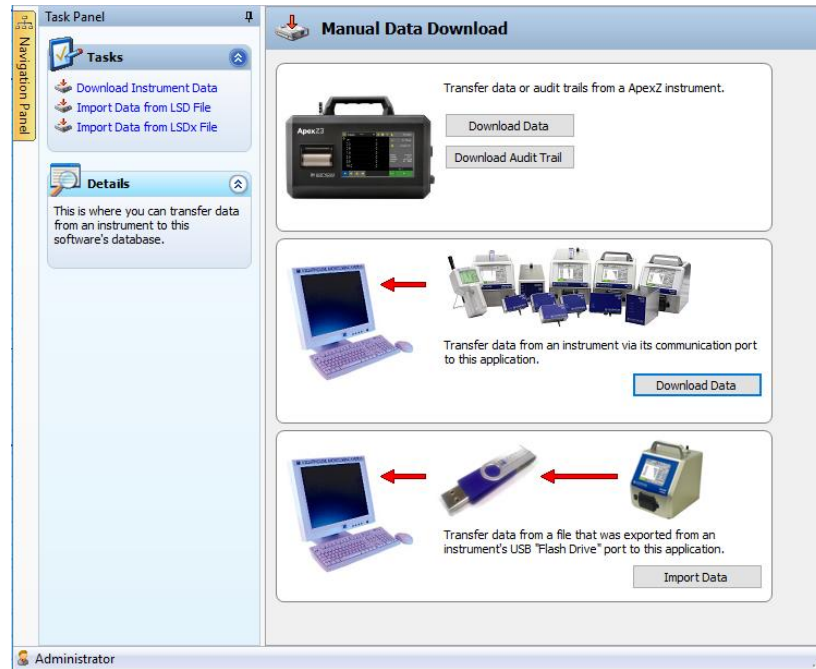


Figure 10-6 Manual Data Download Screen

Press Download Data button to begin Manual Data Download Wizard.

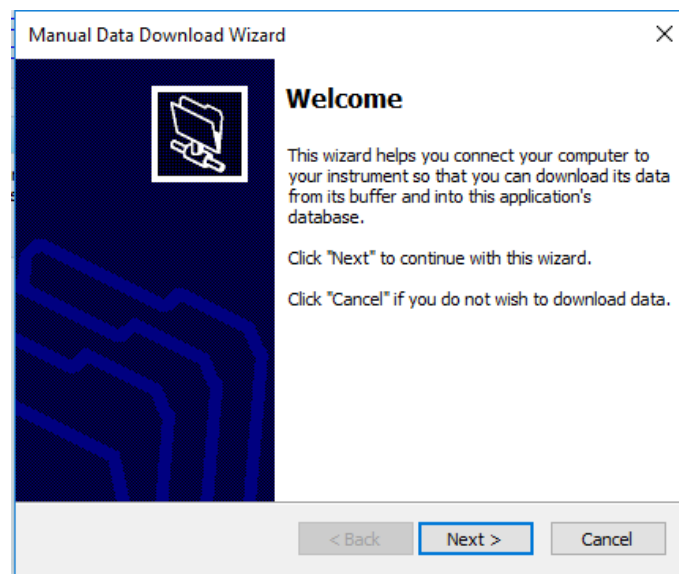
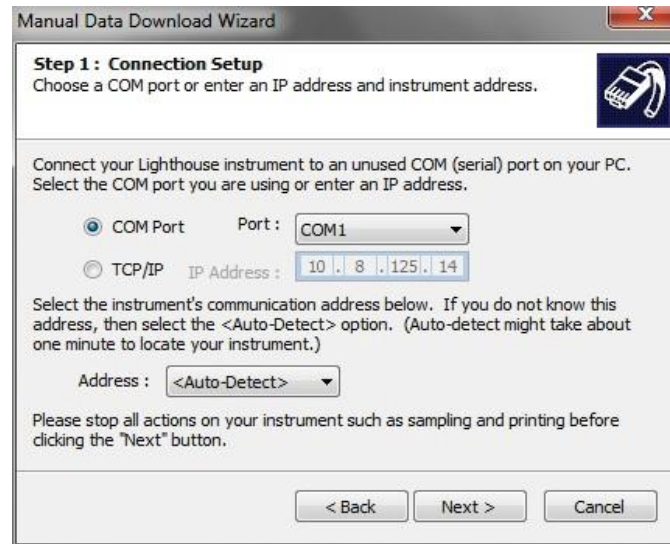


Figure 10-7 Data Download Wizard Welcome

Click Next to continue.



**Figure 10-8 Data Download Wizard, Step 1**

On Step 1, select information to connect to the instrument. By default the COM1 and <Auto-Detect> are selected.

If the user has connected a Lighthouse instrument to a COM port other than COM1, change the COM Port number. If the user has connected a Lighthouse instrument directly to the network or via an Ethernet Adapter, select the TCP/IP option and enter the IP address.

To have **Express** find the address automatically, leave the Address set to <Auto-Detect>. If the user knows the address of the instrument, it can be specified in the Address field to save time. Click Next to continue. If **Express** finds the instrument, the following window appears:





Figure 10-9 Data Download Wizard, Instrument Found

After **Express** has found the instrument, it displays information about the instrument, including the instrument's serial number, address and number of data records.

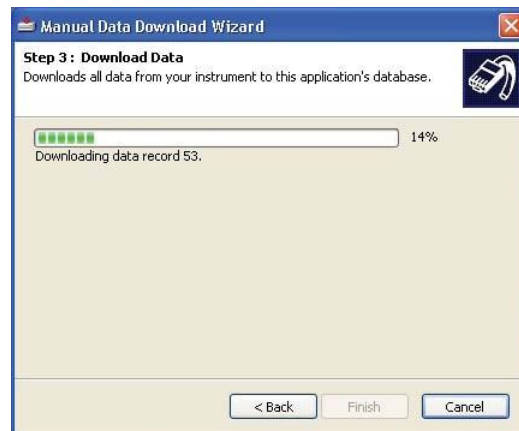
**Note:** *Express* does not download data from disconnected analog inputs such as TRH probes.

Click Next to begin downloading data.

While downloading data, Location Numbers are ignored on instruments that support Location Names. Instead, Location names on the instrument are matched with **Express**' short Location names and assigned their location numbers.

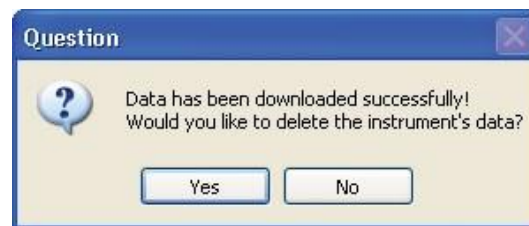
If downloaded data comes from a location name that does not match a short location name in **Express**, a Synchronization Issue dialog window appears. If the user chooses to synchronize the location's name, the location name on the instrument is overwritten.

As **Express** downloads data from the instrument, it updates the download window.



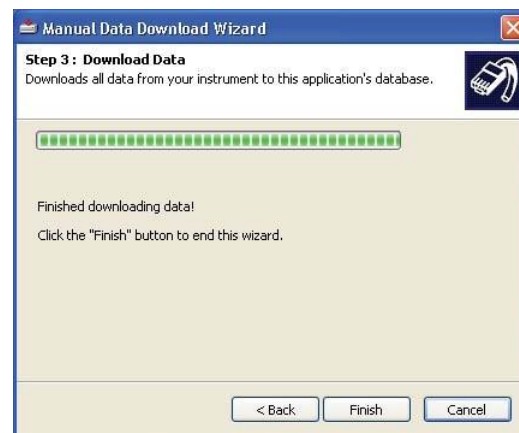
**Figure 10-10 Manual Data Download In Progress**

After the data is downloaded, *Express* displays the following message:



**Figure 10-11 Clear Data Message**

Select **Yes** to clear the data from the instrument or **No** to leave the data intact. Figure 9-7 shows the final window.



**Figure 10-12 Manual Data Download - Finished**

Click Finish to close the Manual Data Download window.

## Trouble Shooting

If the manual download was not successful or if the connection was interrupted during the download, the user may see the following message:



**Figure 10-13 Lost Connection Message Box**

If the instrument is still attached and communication was lost, try one or more of the following actions to correct the issue.

- Attempt to reconnect using the download wizard (starting at Figure 9-1).
- Turn the instrument off, wait a few seconds, turn it on again and retry the download.
- Exit and re-boot the computer. Restart **Express**.
- Unplug the connector from the instrument and reattach it. Try reconnecting and downloading data

**Tip:** After downloading data, users are advised to customize the Instrument and Location data to their specific application. This makes it easier to access and interpret the data.

After **Express** has successfully downloaded data from the instrument, **Express** updates the instrument and location information under the Administrator Options. Users can access the information about the new data set and all the data in graphs, data tables, maps, or standard reports as described in previous chapters of this manual.

## Import Data

**LMS Express** and **Express RT** can import records from **Lighthouse Secure Data** files stored on a Flash Drive (.LSD for ApexP and SOLAIR, and .LSDX for ApexZ instruments). The data records are transferred securely to a Flash Drive, which is removed from the instrument and connected to a computer outside of the cleanroom.

These Flash Drive files contain secure binary records of the data recorded by the Lighthouse instrument. They can be imported only through **LMS Express** or **Express RT** and cannot be altered without destroying the data or causing it to be rejected by the application during import, maintaining 21 CFR Part 11 compliance.

The Manual Data Download screen provides an interface to this feature shown in Figure 10-14



**Figure 10-14 Import Data Feature**

The data import can take place even while real-time data collection is active and notifies the user if data corruption has been detected in the LSD file. Corrupted data, which can be the result of tampering or bad sectors on the Flash Drive, is not imported. If the entire file is corrupt, the process will fail and return the user to the Data Import screen to restart the import.

Successful imports log the instrument name and imported data time range to the Event log, providing data to the audit trail required by 21 CFR Part 11.

## Data Import Wizard

The process starts when the Import Data button (Figure 9-9) is clicked.

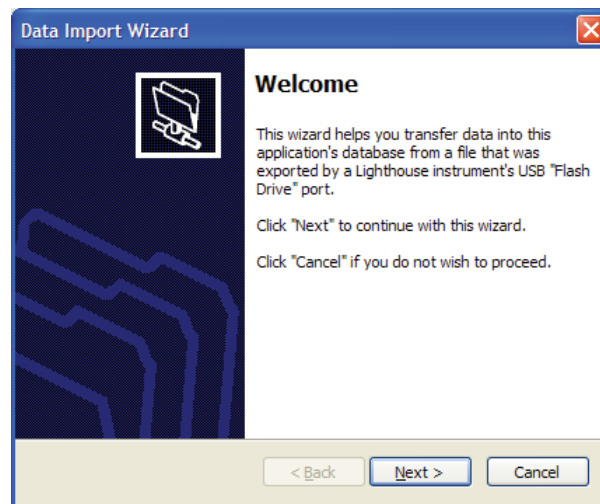


Figure 10-15 Data Import Wizard Start Screen

Click the Next button then **Browse...** for the data drive.

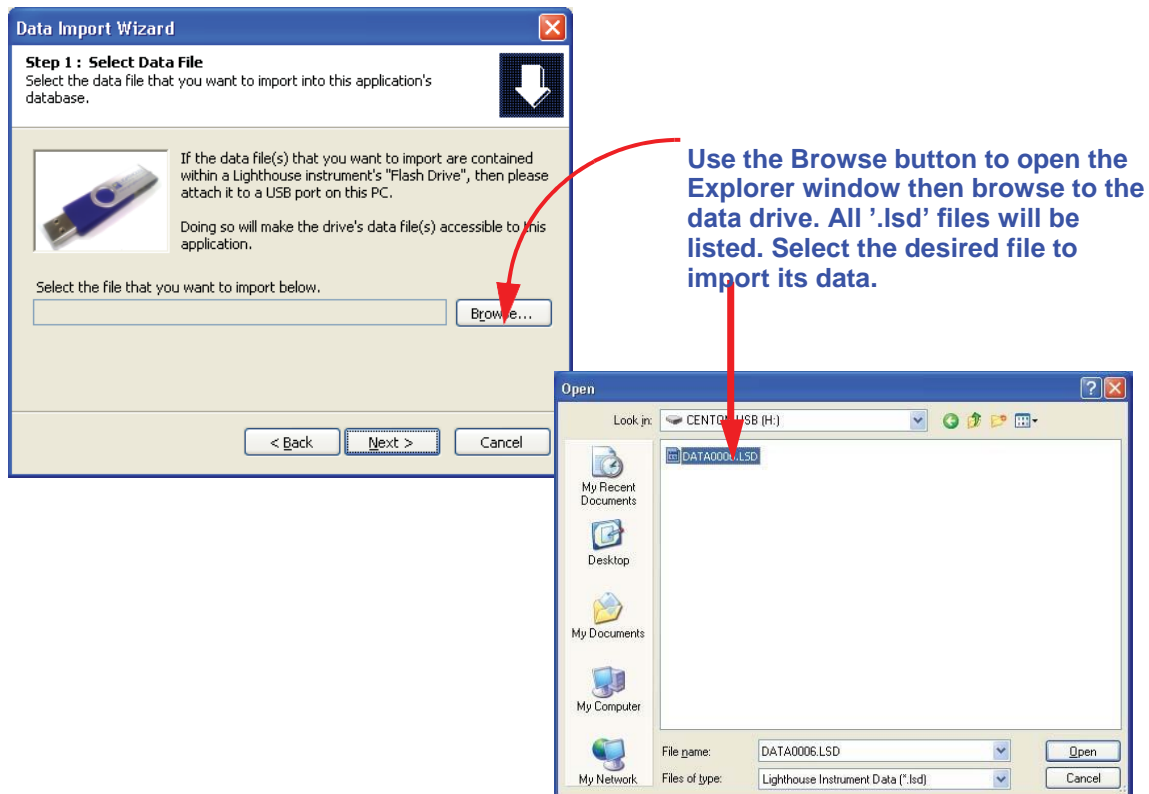


Figure 10-16 Use **Browse...** to Select Source and Data File

Choose the Flash Drive or system hard drive and if it contains data from an Apex P or a SOLAIR download, the Wizard will show them and allow importing from one of those files. The import process can import from only one file at a time. Figure 10-17 shows a valid LSD data file.

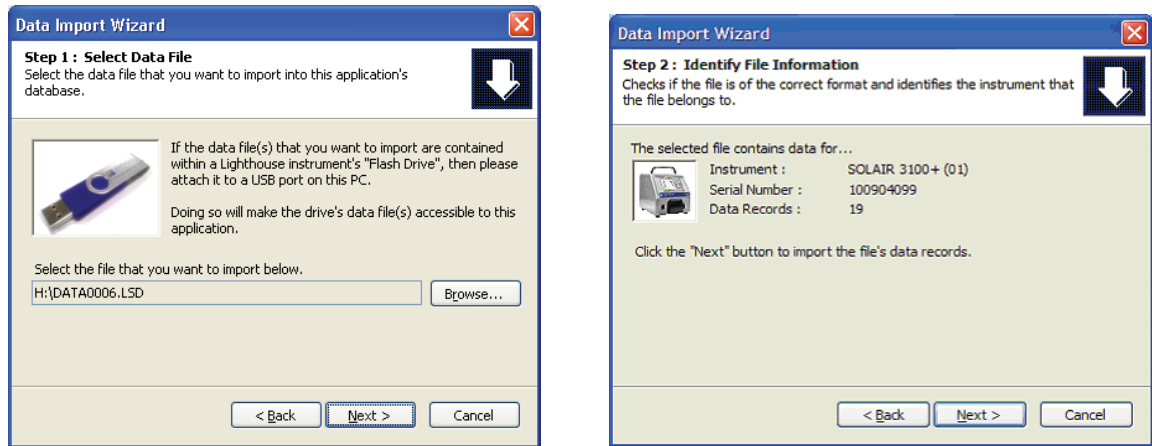


Figure 10-17 Confirm Valid Data File Chosen

If the data cannot be imported or the file was created for a newer version of **Express** (Figure 10-18), the import wizard will halt and only allow the **< Back** button to be used.

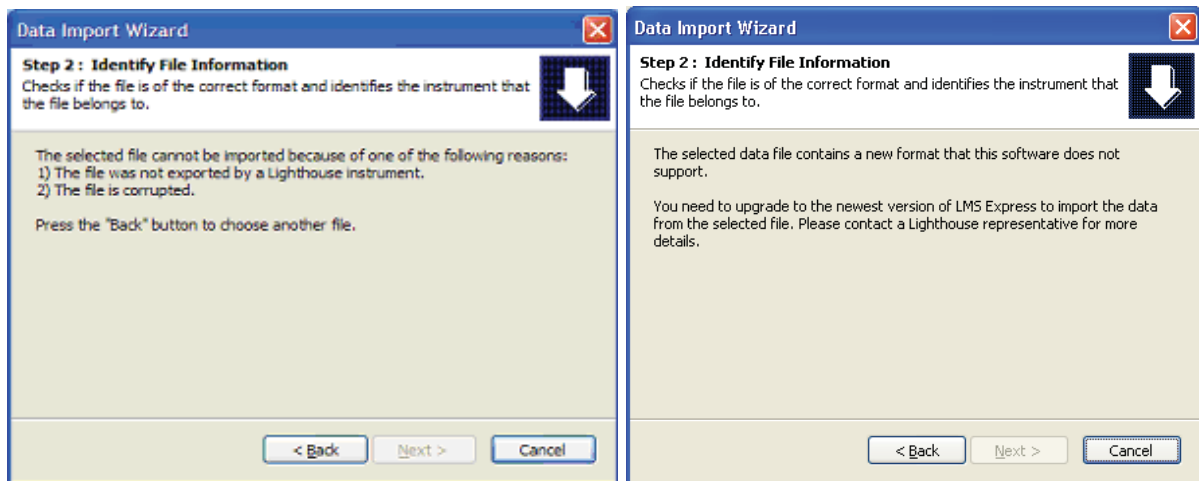
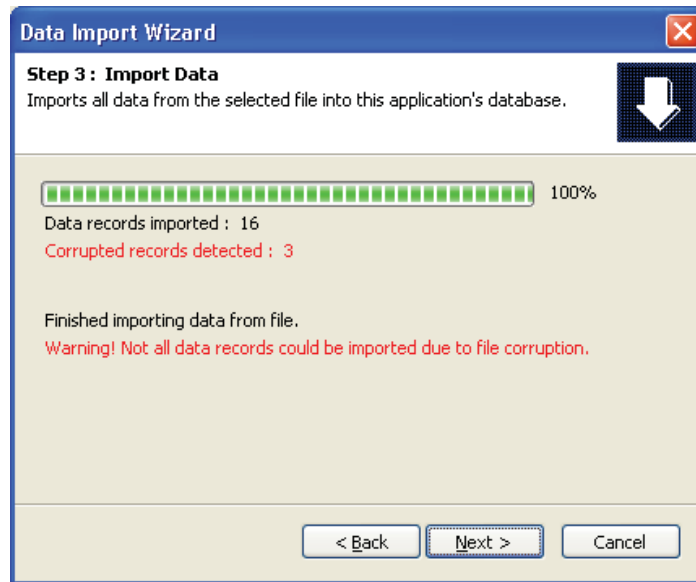


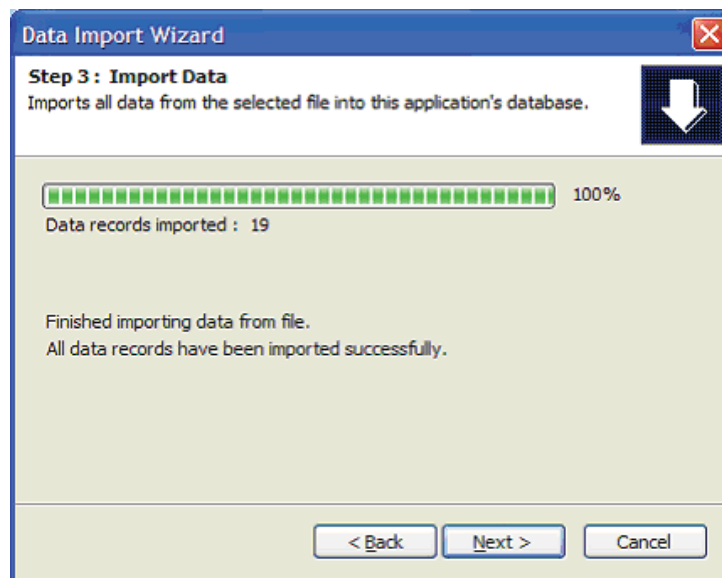
Figure 10-18 Error Screens For Data Import Halt

Figure 10-19 shows the resulting error screen when a file contains corrupted data records that cannot be imported.



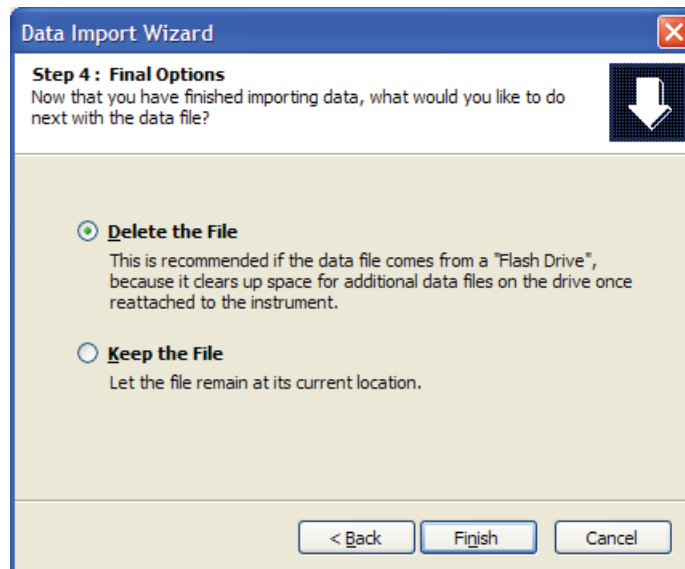
**Figure 10-19 Corrupted Records Blocked From Import**

When all of the data records are successfully imported, the resulting screen (Figure 10-20) is shown to inform the user of the wizard success.



**Figure 10-20 Successful Data Import Screen**

Step 4 of the process requires the user to choose whether to delete the file from which the data was imported or to keep it on the drive (Figure 10-21).



**Figure 10-21 Data Import Step 4**

If the .lsd or .lsdx file is stored on a Flash Drive, it is recommended that it be deleted to free up space on the drive. If the file was stored on a local drive, deletion of the file may not be as important to save space.

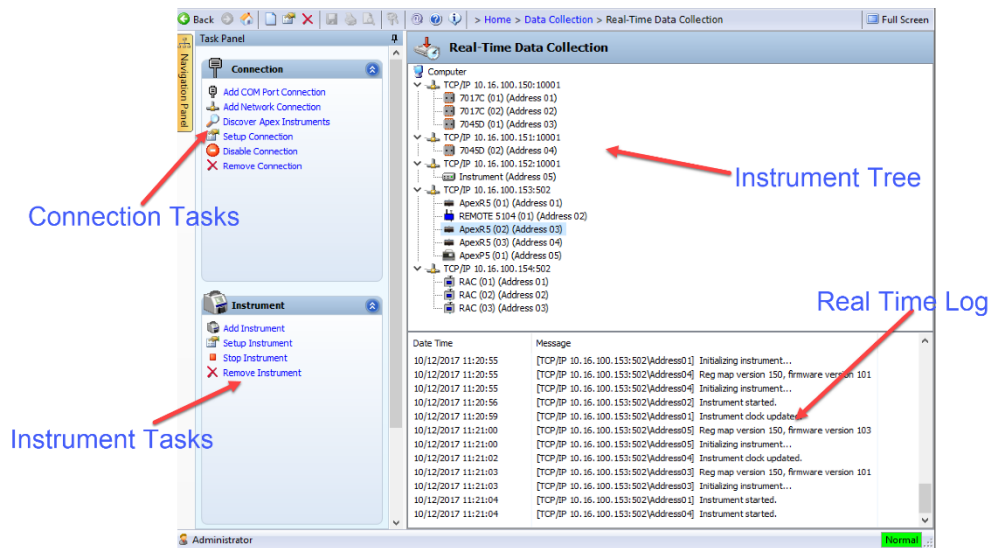


## Real Time Data Collection

**LMS Express RT** can be configured to collect data in real time.

To set up instrument data collection, click on the Home button, Data Collection then on Real Time Data Collection.

Figure 10-22 is an example of the configuration screen layout.



**Figure 10-22 Real Time Configuration Screen Layout**

### Real Time Configuration

**Note:** LMS Express (standard version) cannot download data real time. To download data real time, upgrade to LMS Express RT.

**LMS Express RT** can be configured with up to 100 channels from the following instrument types.

- Airborne particle counters
- Liquid particle counters
- ICP DAS Modules
- Manifold Controllers
- Ultra-Pure Water Instruments

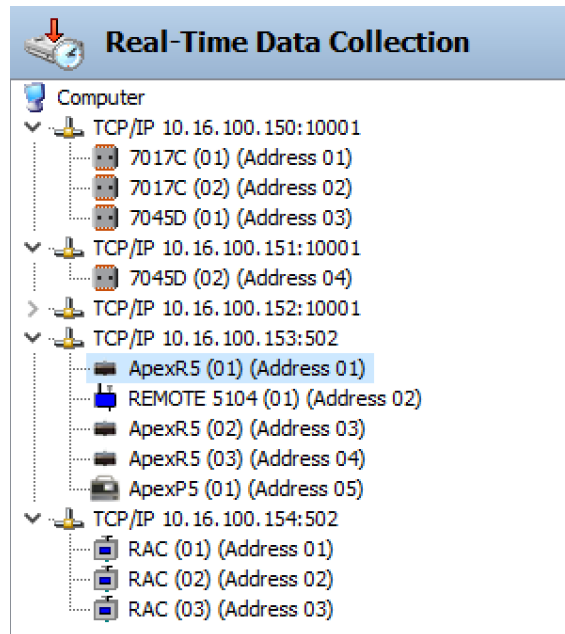
**Note:** The “Real-Time Data Collection” window shows exclamation marks over instrument icons that have measurement errors such as Bad Flow, Instrument Service Required, and so on. Any measurement errors are displayed in red in the Real Time Log.

**LMS Express RT** supports all COM ports available to **Windows**, as well as supporting Ethernet and RS-485 networked devices

The Real Time Data Collection configuration window (Figure 10-22) displays the current configuration and allows users to add, modify, stop or delete instruments using actions found on the left side panel.

### Instrument Tree

Configured ports and instruments are displayed as a tree (Figure 10-23).



**Figure 10-23 Instrument Tree Example**

To the left of each instrument in the instrument tree is an icon depicting what type of instrument it is and the instrument’s current status (OK, Error, or Disabled).

### Setup and Status Menus

Selecting a Computer, COM Port or an Instrument changes the Setup and Status menus displayed on the left side of the Real Time Data Collection view.

To access the available menus, administrators can right-click an item in the Instrument Tree to access a context menu.

## Real Time Log

The log at the bottom of the view shows the most recent real time log activity. Errors or time out messages are shown in red text. All normal messages or status messages are displayed in black text (Figure 10-24).

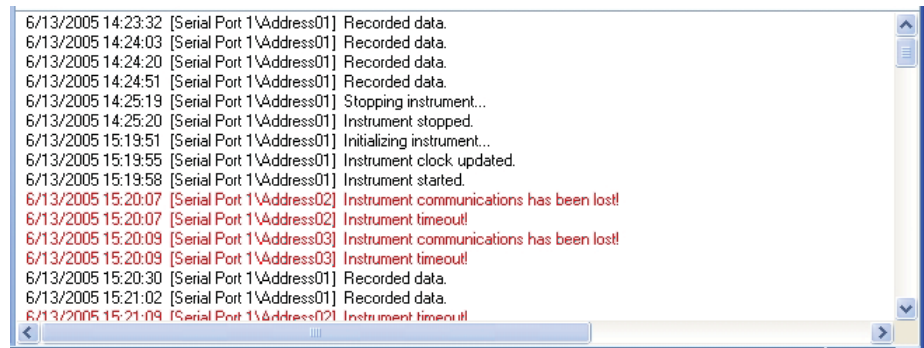


Figure 10-24 Sample - Real Time Log

## Configuration Setup

LMS Express RT supports COM port and Network connections.

## Adding an ApexZ Connection

Click on **Discover Apex Instruments** on the Connection section of the Real Time Data Collection screen Task Panel. Apex instruments must be connected to the Network through Ethernet or Wi-Fi.

**Note:** Auto Discover for ApexZ uses UDP (User Datagram Protocol). User IT Dept. must allow UDP or auto discovery will not work for LMS Express.

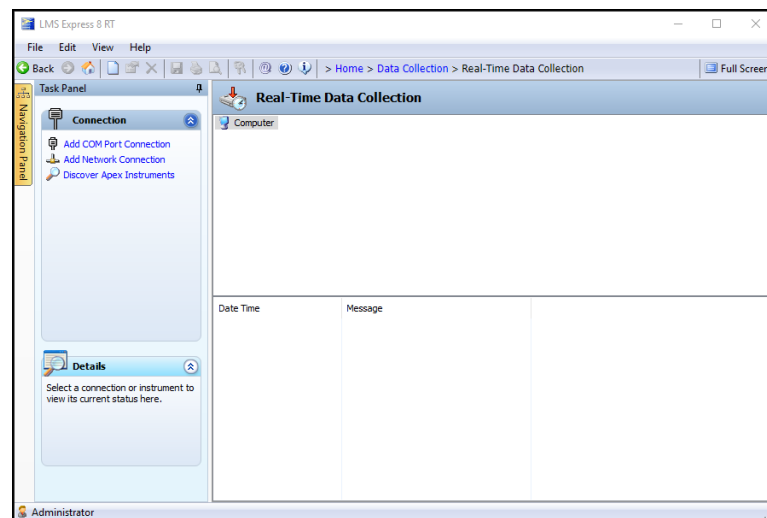


Figure 10-25 Real Time Data Collection

Express will display and search for ApexZ's on the Ethernet or Wi-Fi. Select the desired ApexZ instrument from the list and press Select.

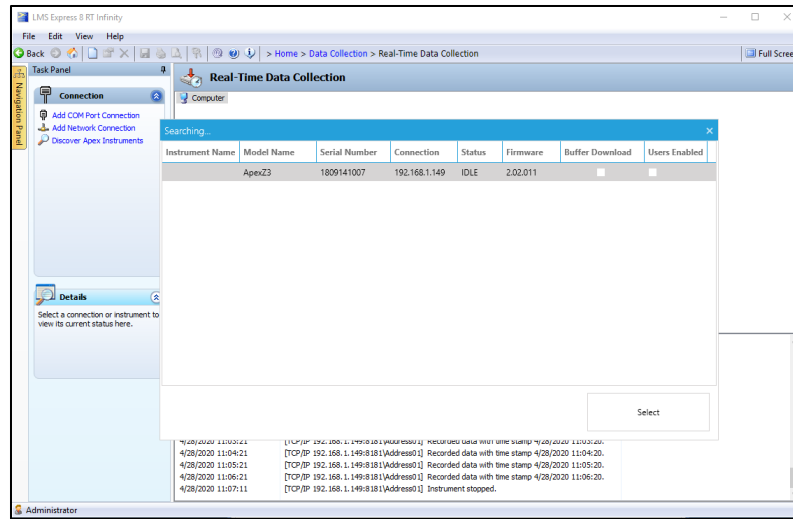


Figure 10-26 Discovering ApexZ instruments

Express will initialize the instrument; start a remote session; and start recording data in real-time from the ApexZ instrument.

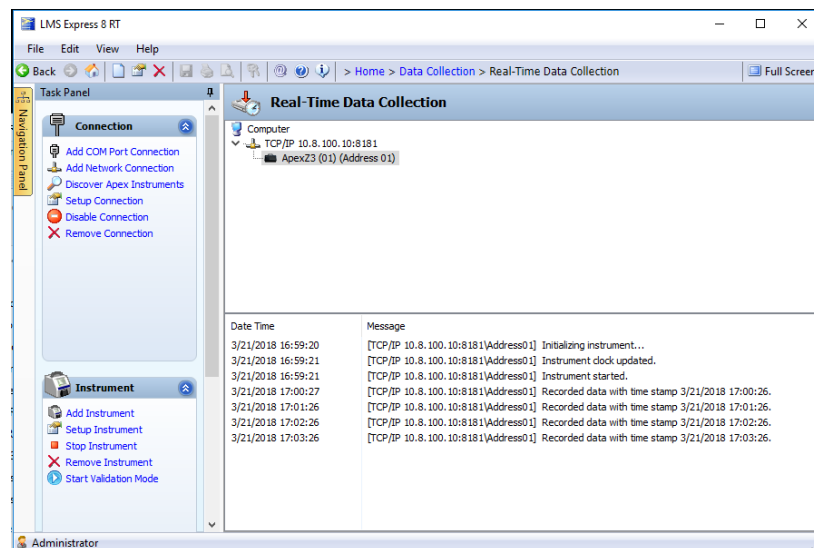


Figure 10-27 ApexZ Real Time Data Collection

## Adding a COM Port Connection

To add a new COM port, click on Add COM Port Connection on the Connection section of the Real Time Data Collection Task Panel to display the COM Port Setup window (Figure 10-28).

### Enable

Select Enable COM port setup and then select Protocol Modbus from the pull down list.

**Note:** COM Ports that are already configured for other Express devices do not appear in the list of available COM Ports.

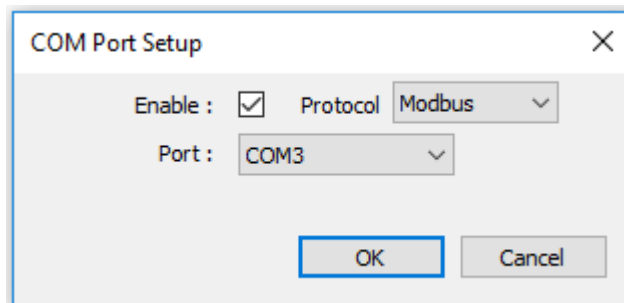


Figure 10-28 COM Port Setup window

### COM Port

Select the COM Port number of the COM port the instrument(s) are connected to. Only ports currently available on the computer are displayed in the pull down list attached to the COM Port field.

### OK/Cancel

Click OK to save the new COM Port or Cancel to exit the window without saving a new COM Port.

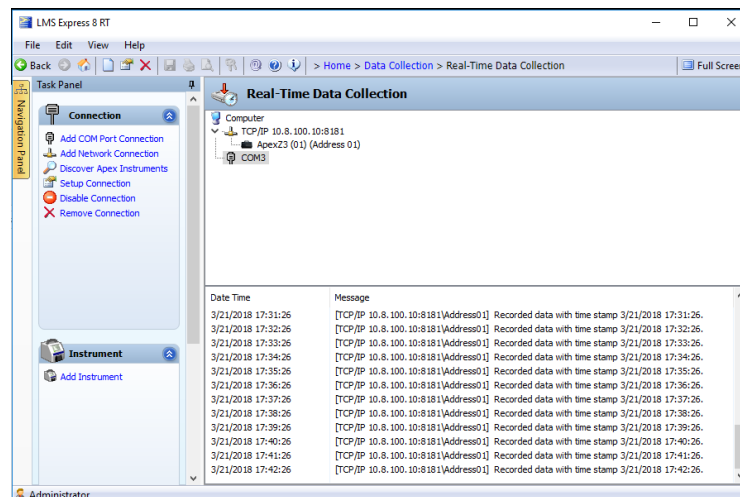
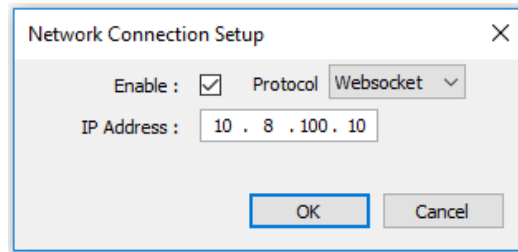


Figure 10-29 COM Port Connection

## Adding a Network Connection

To add a new Network Connection, click on Add Network Connection on the Connection section of the Real Time Data Collection Task Panel and display its dialog box.



**Figure 10-30 Network Connection Websocket Setup Dialog Box**

### Enable

Select Enable to enable the network connection. Data cannot be collected from a disabled IP address.

### Protocol

Select Websocket for ApexZ instrument connection.  
Select Modbus for all other Lighthouse sensors.

### IP Address

Enter the IP address of the instrument or its network adapter.

### OK/Cancel

Click OK to save the new Network Connection or Cancel to exit the window without saving.

## Adding ICP DAS m7017c module connections.

To add a new ICP DAS 7017 Module Connection, click on Add Network Connection on the Connection section of the Real Time Data Collection Task Panel and display its dialog box.

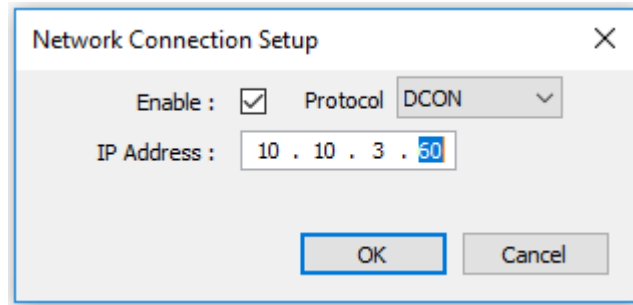


Figure 10-31 DCON Network Connection Setup

### Enable

Select Enable to enable the network connection.

### Protocol

Select DCON from the protocol pull down list.

### IP Address

Enter the IP address of the instrument or its network adapter.

### OK/Cancel

Click OK to save the new DCON Network Connection.

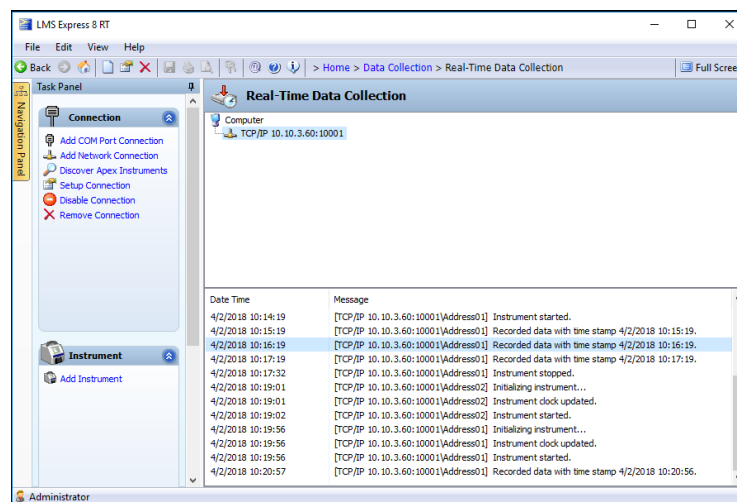


Figure 10-32 DCON Network Connection Setup

## Adding ICP DAS m7017c module device

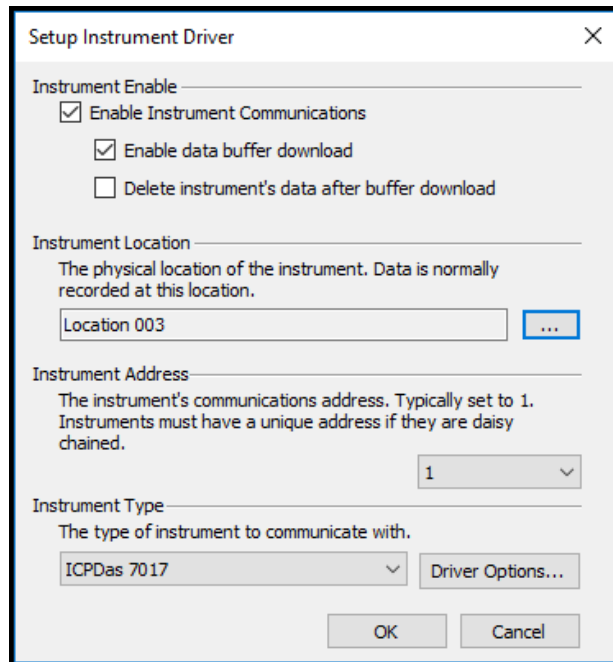


Figure 10-33 Setup Instrument Driver

### Enable Instrument

When **Enable Instrument** is checked, **Express** collects data from the instrument. If the Instrument is disabled, its icon in the Instrument Tree changes to a red X. Data is not collected from disabled instruments.

### Enable Data Buffer Download

The **Enable Data Buffer Download** feature enables downloading the data records that were stored in the instrument buffer while the instrument was not connected to LMS Express (*not currently available with ICPCON devices*).

### Delete Buffer Data

When **Delete instrument's data after buffer download** is checked, Express deletes the instrument buffer data after it has been downloaded. When unchecked, the data is not deleted after buffer download. This option is only available when Data Buffer Download feature is enabled.



**Instrument Location**

Select the **Instrument Location** by clicking the “...” button.  
**Express** supports up to 999 locations.

**Instrument Address**

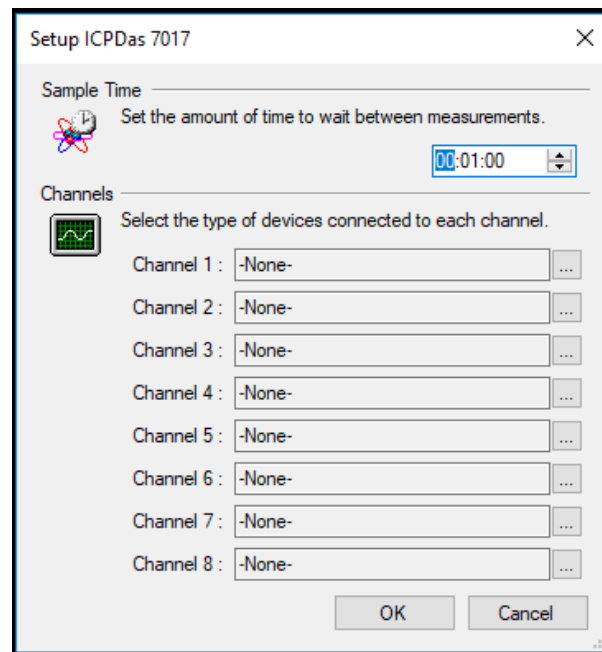
Enter the **Instrument Address** by selecting one from the Instrument Address pull down list.

**Instrument Type**


The instrument type will default to “ICPDas 7017”.

**Driver Options**

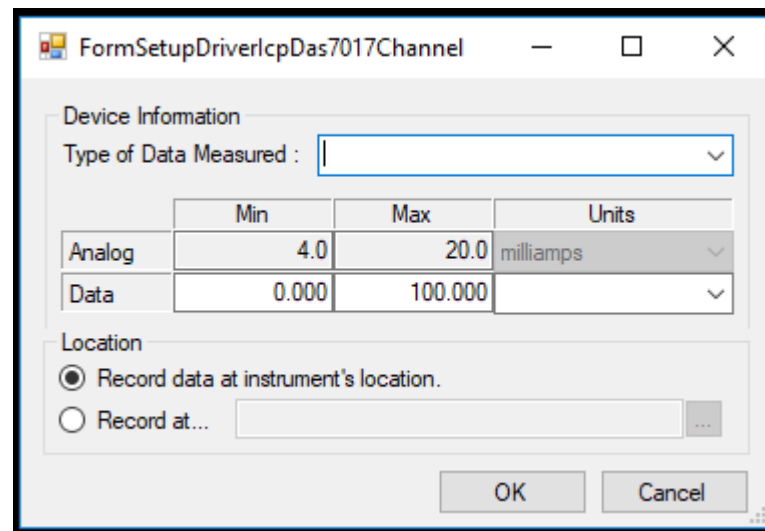
Press the Driver Options... button to assign device channels.



**Figure 10-34 assign device channels**

Press the  button to enter device information.

## Setup Device Information



The screenshot shows a Windows-style dialog box titled "FormSetupDriverIcpDas7017Channel". It contains the following elements:

- Device Information** section:
  - A label "Type of Data Measured :" followed by a dropdown menu.
  - A table with columns: **Min**, **Max**, and **Units**.
- Location** section:
  - Two radio buttons: "Record data at instrument's location." (selected) and "Record at..." (unselected).
  - A text input field next to the "Record at..." radio button.
- Buttons**: "OK" and "Cancel" at the bottom right.

	Min	Max	Units
Analog	4.0	20.0	milliamps
Data	0.000	100.000	

**Figure 10-35 Setup Device Information**

### Setup 7017 attached devices

Select the type of data to be measured.

Select the range of the sensor in the data fields.

Select the units from the pull down list.

Select the location to record the data at.

Click the OK button to save the setup.

## Adding ICP DAS m7045d module connections.

To add a new ICP DAS 7045 Module Connection, click on Add Network Connection on the Connection section of the Real Time Data Collection Task Panel and display its dialog box.

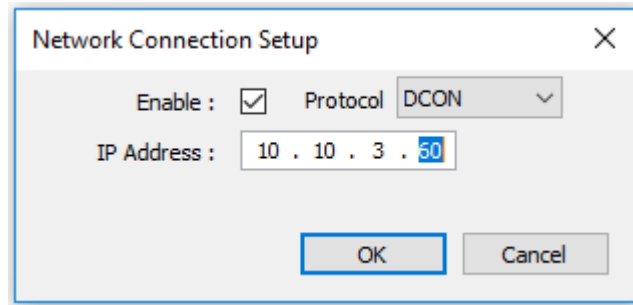


Figure 10-36 DCON Network Connection Setup

### Enable

Select Enable to enable the network connection.

### Protocol

Select DCON from the protocol pull down list.

### IP Address

Enter the IP address of the instrument or its network adapter.

### OK/Cancel

Click OK to save the new DCON Network Connection.

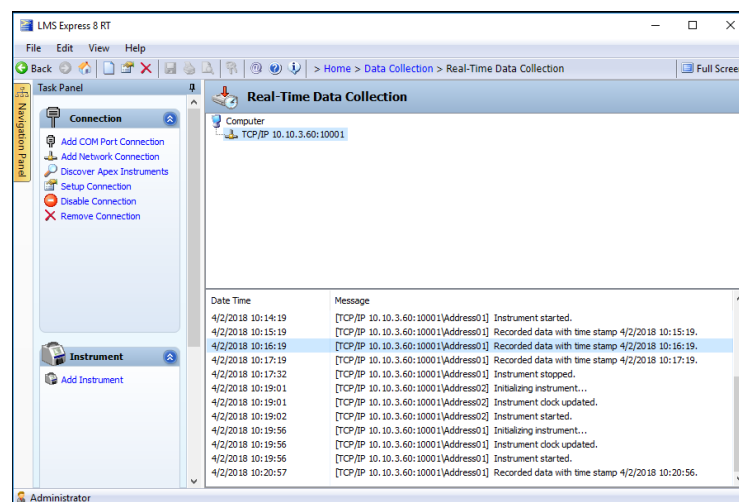


Figure 10-37 DCON Network Connection Setup

## Adding a 7045 module device.

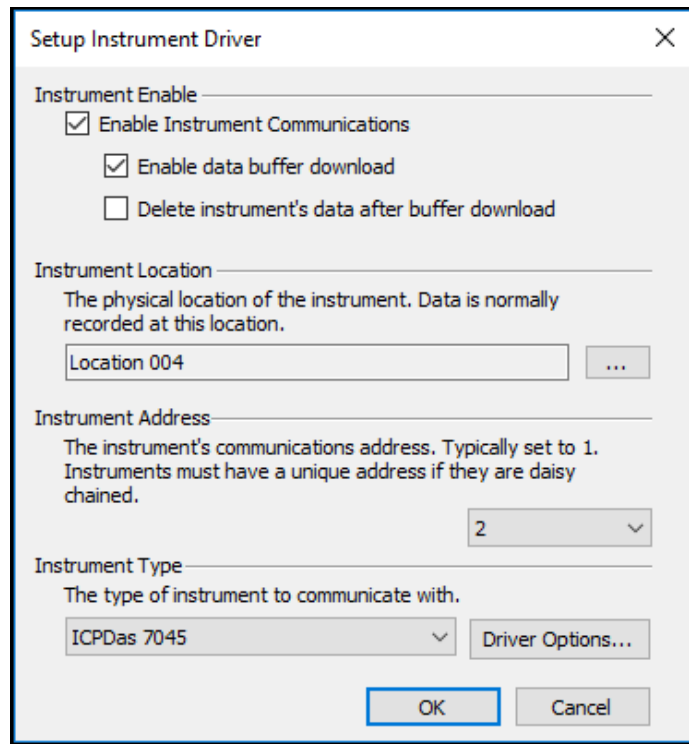


Figure 10-38 Setup Instrument Driver

### Enable Instrument

When **Enable Instrument** is checked, **Express** collects data from the instrument. If the Instrument is disabled, its icon in the Instrument Tree changes to a red X. Data is not collected from disabled instruments.

### Enable Data Buffer Download

The **Enable Data Buffer Download** feature enables downloading the data records that were stored in the instrument buffer while the instrument was not connected to LMS Express.

### Delete Buffer Data

When **Delete instrument's data after buffer download** is checked, Express deletes the instrument buffer data after it has been downloaded. When unchecked, the data is not deleted after buffer download. This option is only available when Data Buffer Download feature is enabled.

**Instrument Location**

Select the **Instrument Location** by clicking the “...” button.  
**Express** supports up to 999 locations.

**Instrument Address**

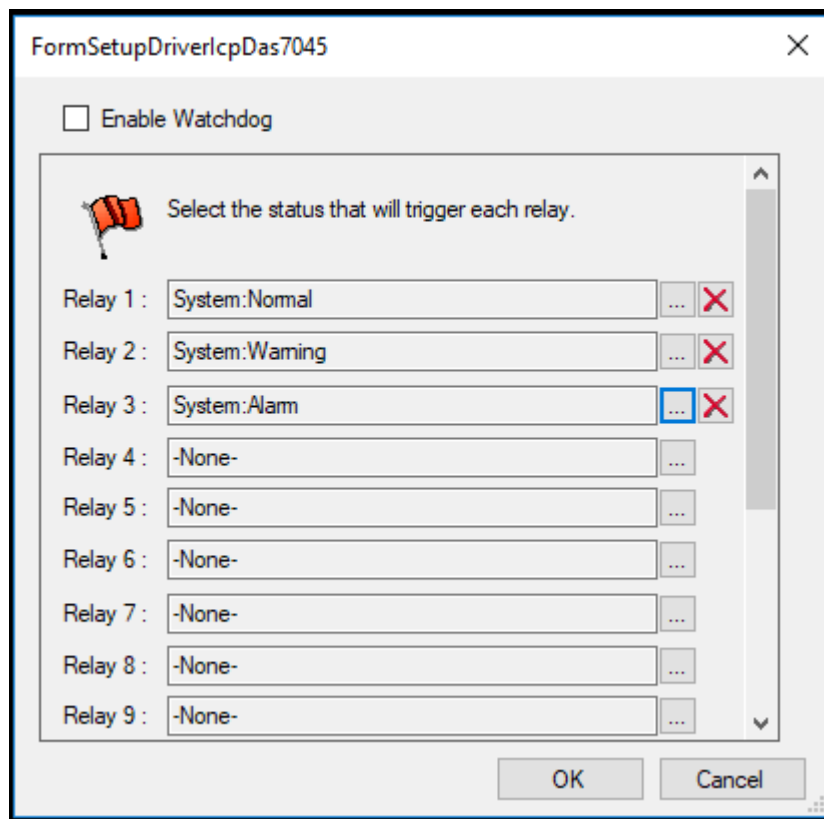
Enter the **Instrument Address** by selecting one from the Instrument Address pull down list.

**Instrument Type**


The instrument type will default to “ICPDas 7045”.

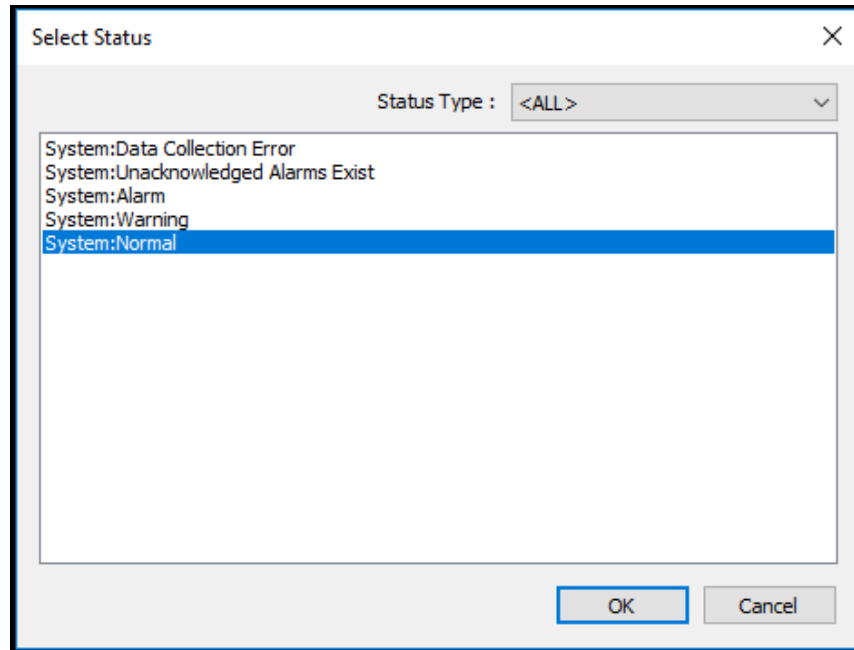
**Driver Options**

Press the Driver Options button to enter ICPDas 7045 device relays.



**Figure 10-39 Setup Device Information**

Press the  button to select the System Status.



**Figure 10-40 Select Status**

### **Select Relay Status**

Select the relay status and press OK to save to that relay.

## Adding a Network or COM port instrument

To add a network connected instrument from the Real-Time Data Collection screen select a network connection or COM port and press “Add Instrument” from the Instrument section of the Task Panel.

In the Instrument section of the Real Time Data Collection Task Panel, click Add Instrument to display the **Setup Instrument Driver** dialog box:

**Note:** *LMS Express RT overrides the sample and hold times set on the instrument.*

**Note:** *Administrators can give locations more descriptive titles than “Location 000” by renaming location(s) on the Locations View.*

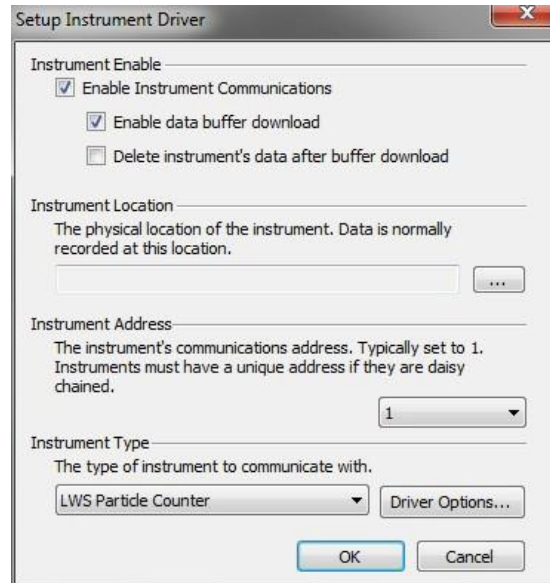


Figure 10-41 Set Up Instrument Driver

### Enable Instrument

When **Enable Instrument** is checked, **Express** collects data from the instrument. If the Instrument is disabled, its icon in the Instrument Tree changes to a red X. Data is not collected from disabled instruments.

### Enable Data Buffer Download

The **Enable Data Buffer Download** feature enables downloading the data records that were stored in the instrument buffer while the instrument was not connected to LMS Express.

## Delete Buffer Data

When **Delete instrument's data after buffer download** is checked, Express deletes the instrument buffer data after it has been downloaded. When unchecked, the data is not deleted after buffer download. This option is only available when Data Buffer Download feature is enabled and only for Lighthouse instruments.

## Instrument Location

Select the **Instrument Location** by clicking the "..." button. **Express** supports up to 999 locations.

## Instrument Address

Enter the **Instrument Address** by selecting one from the Instrument Address pull down list.

## Instrument Type:

The instrument type will default to "ApexZ".

## Driver Options

**Note:** *The minimum sample time is 10 seconds on LWS Particle Counters drivers only, all other drivers remain at 30 seconds.*

Press the Driver Options button to enter default sample time and hold times for the instrument.

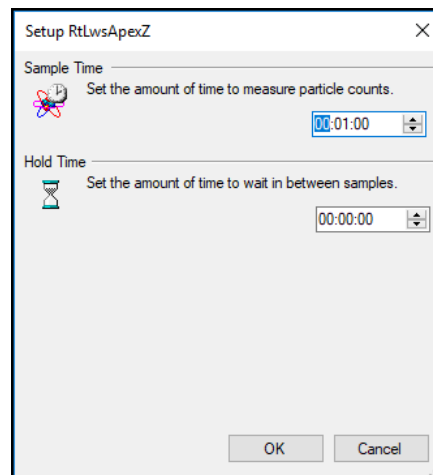


Figure 10-42 ApexZ Driver Options window



### Sample Time

Enter the sample time desired. Sample time is of the format, HH:MM:SS. The default Sample Time is 1:00 (1 minute).

### Hold Time

Enter the amount of time to hold between samples. The default is 00:00:00 (HH:MM:SS), i.e. not to hold between samples.

### Usage Mode

LWS instruments record their location (as programmed into the instrument) with count and any optional environmental data. For example, an instrument has been set up as Location 019; all data will be "identified" with that location stamp as it is stored in the instrument's data buffer.

**WARNING:** *Portable mode works with any particle counter and Validation mode only works with Apex particle counters.*

The **Express** software has two areas to select instrument locations that are valid for data buffer download: **Instrument Setup** window and **Admin Options, Locations**. In "default" mode, data is downloaded when the location of the data on the instrument matches the location set in the **Instrument Setup** window. When the "portable mode" is selected, the instrument's data that has been recorded using the same locations as set in **Admin Options, Locations** will be downloaded. **Admin Options, Locations** dictates which locations will be downloaded.

When an Apex is chosen and **Use the instrument as a portable or Apex** is checked, **Express** places the instrument into portable/Apex mode. While in this mode, the software checks the **Admin Options, Locations** numbers and downloads the instrument buffer if the instrument's internal location matches any of the selected numbers in **Admin Options, Locations**. If the instrument's location does not match any location in the list, no download will take place. When the "Apex" mode is disabled, **Express** matches the Instrument Location to the **Instrument Setup** number and downloads the data for that specific location.

**Note:** *Validation feature works only with Apex instruments.*

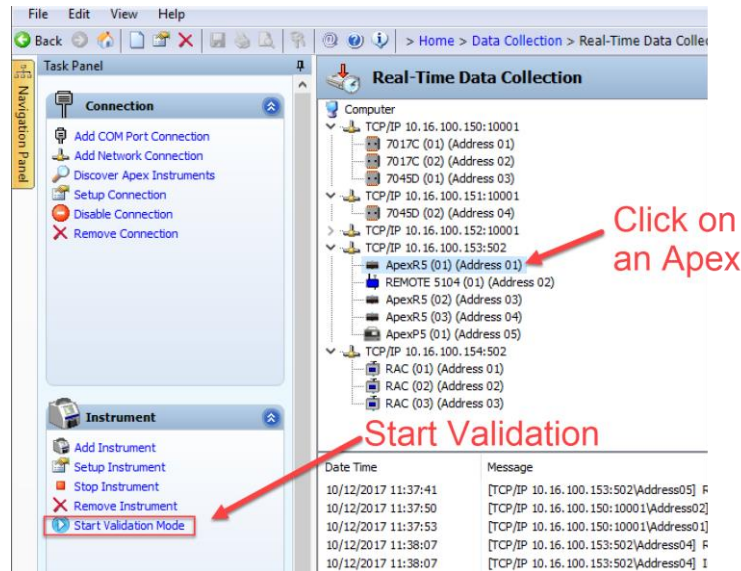


Figure 10-43 Start Validation Feature

## Start Validation

Clicking an Apex R5 in the Instrument Tree followed by Start Validation (Figure 10-43), starts the feature, which flashes the Apex's Alarm LED blue and changes the Start Validation to Stop Validation. This feature helps identify the Apex with which the program is communicating and only works with Apex instruments.

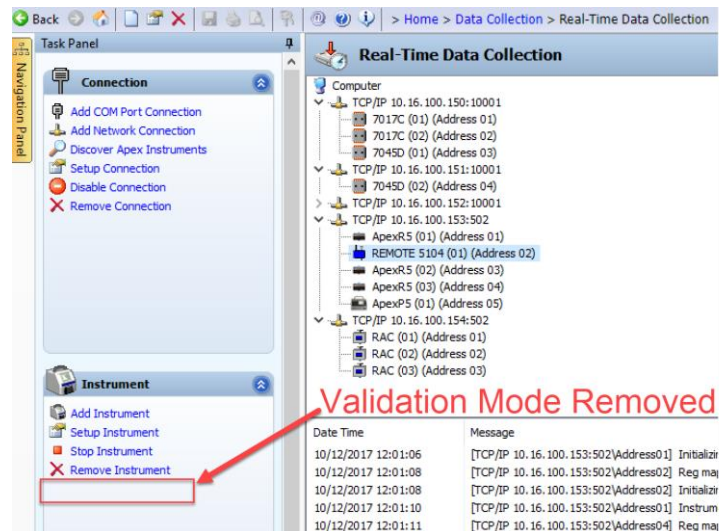


Figure 10-44 Validation Mode not Supported Screen

## Validation Mode not supported

Selecting a non-Apex instrument causes the Validation Mode to be removed from view. Select an Apex counter, instead.

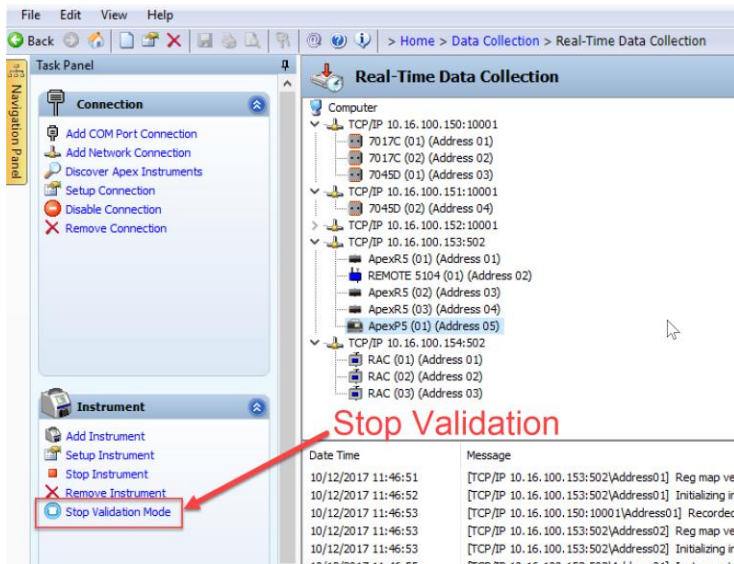


Figure 10-45 Stop Validation Feature

## Stop Validation

Clicking Stop Validation (Figure 10-45) will stop the Alarm LED flashing.

## One Second Data Update

**Note:** This feature is only supported on NanoCounts, Remote 1104LD with firmware version 1.31 and greater, and Remote LPC 1.5 with firmware version 2.0 and greater instruments.

When One Second Data Update feature is checked, the software gets data from the instrument every second. Only one instrument per connection is allowed for One Second Data Update.

If there is more than one instrument that has this feature enabled, the error message shown in Figure 10-46 is displayed.



Figure 10-46 Configuration Error

## LWS 32 Position Manifold Driver Options

If the administrator has selected LWS 32 Position Manifold for the instrument's type, the following window appears when the administrator clicks on the Driver Options button,

**Note:** *Sample Time, Purge Time and Manifold Sequence must be configured on the Manifold Controller itself. The Manifold Controller's Sample Time should be at least one minute.*

The screenshot shows a dialog box titled "Setup Instrument Driver". It contains several sections for configuration:

- Instrument Enable:** Three checkboxes are present: "Enable Instrument Communications" (checked), "Enable data buffer download" (checked), and "Delete instrument's data after buffer download" (unchecked).
- Instrument Location:** A text field with a description: "The physical location of the instrument. Data is normally recorded at this location." and a browse button (three dots).
- Instrument Address:** A text field with a description: "The instrument's communications address. Typically set to 1. Instruments must have a unique address if they are daisy chained." and a dropdown menu currently showing "1".
- Instrument Type:** A dropdown menu showing "LWS 32 Position Manifold" and a "Driver Options..." button.

At the bottom of the dialog are "OK" and "Cancel" buttons.

**Figure 10-47 Setup 32-Position Manifold**

To tie the Manifold Controller's position number to a location configured in LMS Express RT, select a position on the Setup Manifold Controller window and click the Set Location button.

The following Select Location window appears. Select a location and click OK to return it to the Setup Manifold Controller window.

**Note:** Location names are configured in Express under Administrator Options.

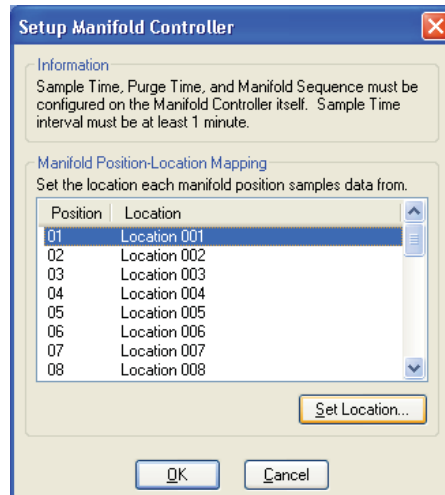


Figure 10-48 LWS 32 Position Manifold, Select Location

### LWS 6 Position Manifold Driver Options

If the administrator has selected LWS 6 Position Manifold for the instrument's type, the following window appears when he/she clicks on the Driver Options button.

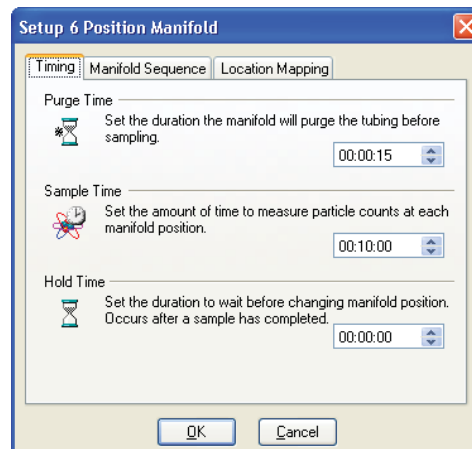


Figure 10-49 Setup 6 Position Manifold - Timing window

On the timing tab of the Setup 6 Position Manifold window, enter values for the following fields,

## Purge Time

Enter the purge time desired. Purge time is of the format (HH:MM:SS). The default Purge Time is 00:15 (15 seconds).

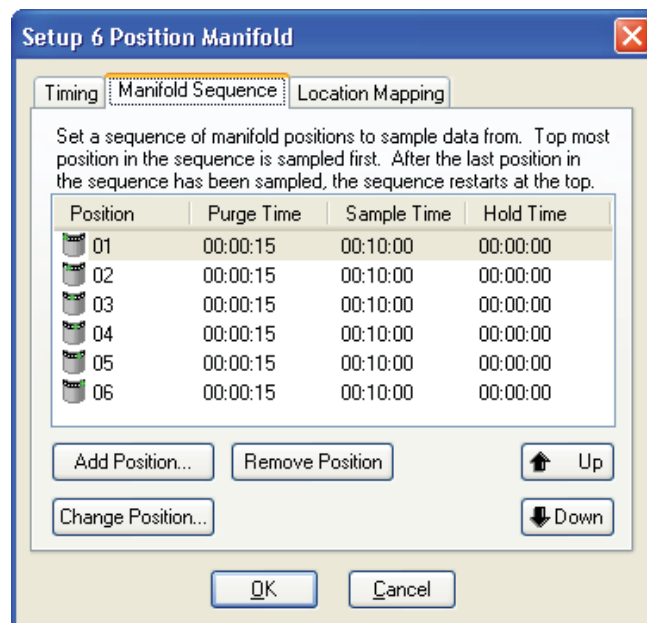
## Sample Time

Enter the sample time desired. Sample time is of the format (HH:MM:SS). The default Sample Time is 10:00 (10 minutes) and the minimum is 00:30 (30 seconds).

## Hold Time

Enter the amount of time to hold between samples. The default is 00:00:00 (HH:MM:SS), i.e. the default is to not hold between samples.

Click the Manifold Sequence Tab to the Manifold Sequencing window.



**Figure 10-50 Setup 6 Position Manifold - Sequence**

On the Manifold Sequence tab the administrator sets the sequence of manifold positions to sample data from. The position that is topmost in the selected list is sampled from first. After the last position is sampled from, the manifold restarts sequencing from the start of the list.

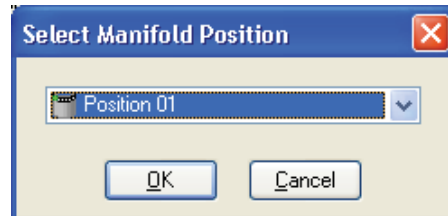
Administrators can change the order of the manifold positions by selecting a position and clicking the up or down arrows.

To change a selection in the sequence to a different manifold position,

select a row and click the Change Position button.

To remove a position, select a position and click the Remove Position button.

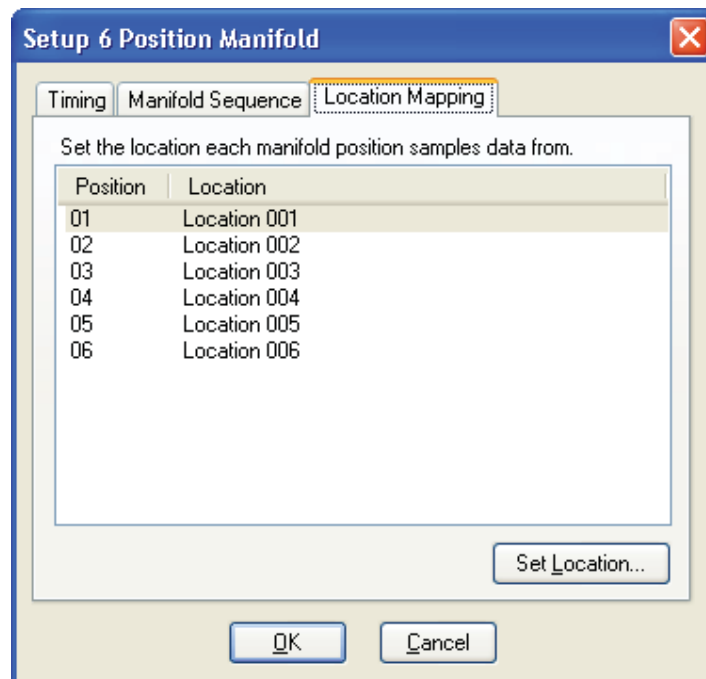
To add a manifold position to the list, click the Add Position button to display the Select Position dialog box:



**Figure 10-51 Select Position Dialog Box**

To add a new Manifold position, select a position from the pulldown list and click OK.

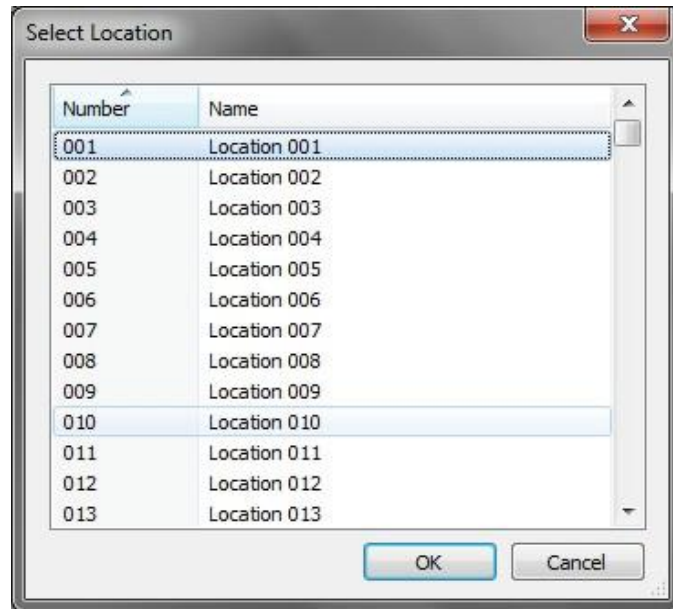
Click the Location Mapping tab to display its setup window.



**Figure 10-52 Setup 6 Position Manifold - Location window**

The Location Mapping window allows administrators to configure which position on the manifold is sampling data from which location.

To map a position to a location, select the desired position number and click the Set Location button. The following Select Location window appears.



**Figure 10-53 6 Position Manifold, Select Location**

Select a location from the list and click the OK button.

After configuring the 6 Position Manifold driver, click the OK button on the bottom of the Setup 6 Position Manifold window.



## LWS AMC Manifold Controller Driver Options

If the administrator has selected **LWS AMC Manifold Controller** for the instrument type, the window shown in Figure 10-54 appears when the Driver Options button is clicked.

**Note:** Sample Time Purge Time and Manifold Sequence must be configured on the Manifold Controller itself. The Manifold Controller's Sample Time should be at least one minute.

The dialog box is titled "Setup Instrument Driver". It contains the following sections:

- Instrument Enable:** Three checkboxes: "Enable Instrument Communications" (checked), "Enable data buffer download" (checked), and "Delete instrument's data after buffer download" (unchecked).
- Instrument Location:** A text field with a description: "The physical location of the instrument. Data is normally recorded at this location." and a "..." button to the right.
- Instrument Address:** A dropdown menu with a description: "The instrument's communications address. Typically set to 1. Instruments must have a unique address if they are daisy chained." The dropdown shows "1".
- Instrument Type:** A dropdown menu with a description: "The type of instrument to communicate with." The dropdown shows "LWS AMC Manifold Controller". To the right of the dropdown is a "Driver Options..." button.

At the bottom of the dialog are "OK" and "Cancel" buttons.

Figure 10-54 Set up LWS AMC Manifold Controller

To tie the **LWS AMC Manifold Controller** position number to a location configured in **LMS Express RT**, select a position on the Setup AMC Manifold Controller window and click the Set Location button.

**Note:** Location names are configured in LMS Express on the Admin Shortcut menu.

The following Select Location window appears. Select a location and click OK to return it to the Setup AMC Manifold Controller window.

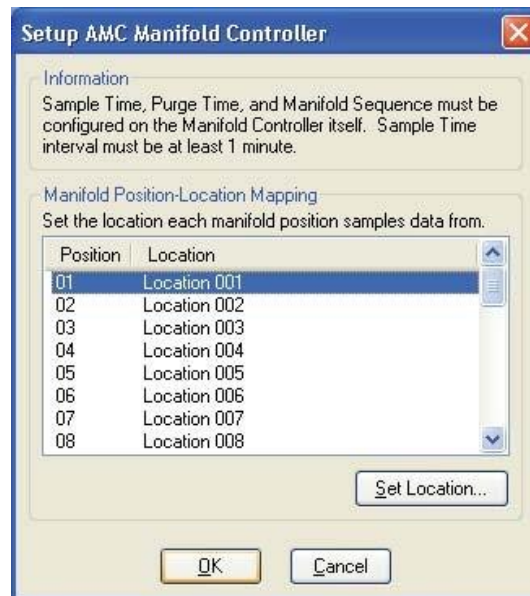


Figure 10-55 LWS AMC Manifold, Select Location

## LWS Mini Multiplexer Driver Options

If the administrator has selected *LWS Mini Multiplexer* for the instrument type, the window shown in Figure 10-56 appears when the administrator clicks on the Driver Options button.

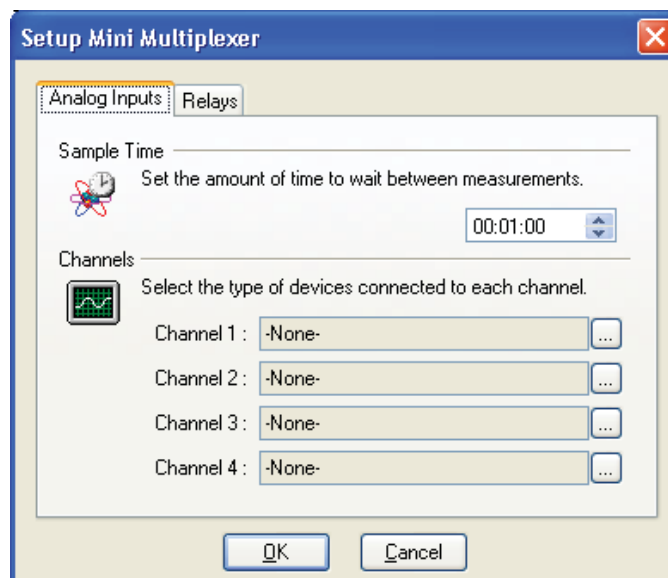


Figure 10-56 Setup Mini Multiplexer - Analog Inputs

Use the Analog Inputs tab to:

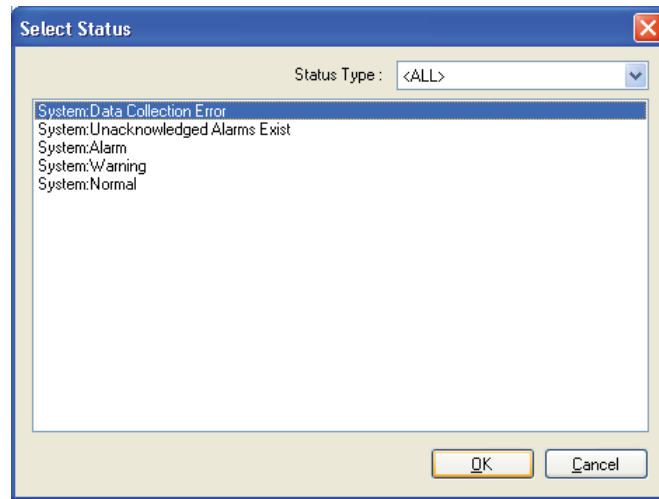
- Set the Sample Time to how often you want to record data from all configured analog channels. The default is one minute.
- Assign up to four channels. Select the type of device connected to each channel by clicking the “...” button next to the channel. On the Setup Analog Channel window that displays, pick from a pull down list of device types available. Select a device type, “-None-” or “-Custom-” and click OK.

To set up from one to four relays channels for the Mini Multiplexer, click the Relays tab. The following window displays.



**Figure 10-57 Setup Mini Multiplexer - Relays**

Assign status' to up to four relays. Select the status displayed by each relay by clicking the "..." button next to the relay. Refer to Figure 10-58, Select Status window, for details.



**Figure 10-58 Mini Multiplexer - Select Status**

The Select Status window allows you to assign a particular status to an instrument relay. There are three status conditions:

- **System Status:** Represents the worst alarm status out of all data collected in the system. The System's status is displayed on the application's status bar. The "Unacknowledged Alarms Exist" status is set when that alert is displayed on the application's status bar and it is cleared when "all" alarms have been acknowledged.
- **Alarm Group Status:** Represents the current alarm, warning, normal, and error status of an alarm group configured in the Alarm Triggers screen. Assign relays to an alarm group status if you're only interested in displaying the worst status of a sub-set of data in the system.
- **Real-Time Instrument Status:** Represents the status of one instrument configured in the Real-Time Data Collection screen. The instrument's alarm, warning, and normal statuses represent the worse status of all data belonging to that instrument. The "Data Collection Error" status is set if any data collection errors have occurred such as a time-out, port failure, or a measurement error such as "Bad Flow". "Started" and "Stopped" statuses are intended to activate the vacuum for Remote particle counters not equipped with internal pumps.

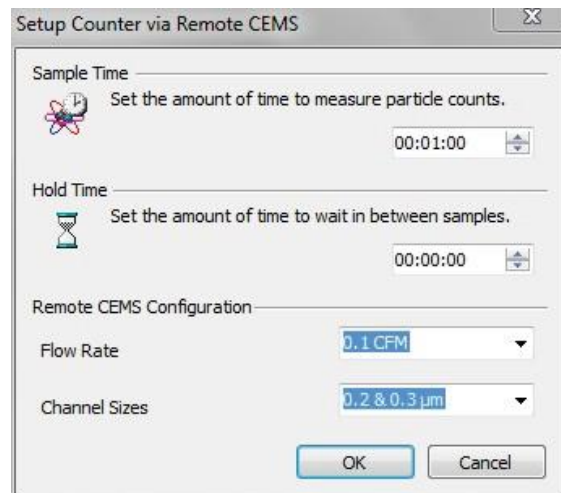
Select the status desired and click the OK button to assign it to one of

the four relays.

To clear a status from a relay, click the X button next to it. After you have setup up all the desired relays, click the OK button to close the Setup Mini Multiplexer window.

### LWS Particle Counter via Remote CEMS

If the administrator has selected LWS Particle Counter via Remote CEMS for instrument type, the window shown in Figure 10-59 appears when the Drivers Options button is clicked.



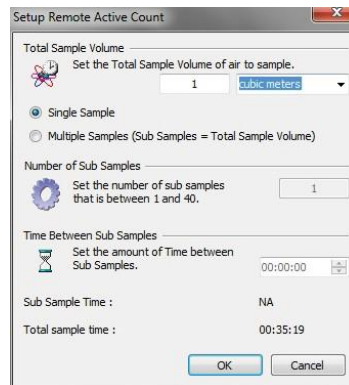
**Figure 10-59 Setup Counter via Remote CEMS**

On the Setup Counter via Remote CEMS window, enter sample time, hold time, flow rate and channel sizes for the instrument.

- **Sample Time:** Enter the sample time desired. Sample time is in the format (HH:MM:SS). The default sample time is 1:00 (1 minute).
- **Hold Time:** Enter the amount of time to hold between samples. The default is 00:00:00 (HH:MM:SS), i.e not to hold between samples.
- **Flow Fate:** Flow rate is auto selected for 4-series instruments. For the 0-series instruments, select the appropriate flow rate from the list. The default flow rate is 0.1 CFM.
- **Channel Sizes:** Channel sizes are auto selected for 4-series instruments. For the 0-series instruments, select the appropriate channel sizes from the list. The default channel sizes are 0.2 and 0.3 $\mu$ m.
- **OK/Cancel Buttons:** Click OK to accept the entered sample and hold values, or Cancel to close the Setup Counter via Remote CEMS window without saving the changes.

## LWS Remote Active Count Driver Options

If the administrator has selected LWS Remote Active Count for instrument type, the window shown in Figure 10-60 appears when the Driver Options button is clicked.



**Figure 10-60 Setup Remote Active Count**

On the Setup Remote Active Count window, enter the Total Sample Volume, Number of Sub Samples and Time Between Sub Samples, if Multiple Samples is selected.

- **Total Sample Volume:** Enter the total sample volume desired and select the appropriate units. The default total sample volume is 1 and units are m<sup>3</sup>.
- **Single Sample:** If single sample is selected, the options for Number of Samples and Time Between Samples are disabled.
- **Multiple Samples:** If multiple samples option is selected, the Number of Samples and Time Between Samples are enabled.
- **Time Between Sub Samples:** Enter the amount of time to hold between the samples. The default is 00:00:00 (HH:MM:SS), i.e not to hold between the samples.
- **Number of Sub Samples:** Enter the number of cycles. The sample volume entered above will be equally shared between the number of cycles entered. The default is 1.
- **Sub Sample Time:** Software auto calculates based on the value entered in the Number of Sub Samples field. When Single Sample is selected, the sub sample time is NA.
- **Total Sample Time:** Software auto calculates based on the values entered in the Number of Sub Samples and Time Between Sub Samples fields. When Single Sample is selected, the Total Sample Time is 00:35:19.
- **OK/Cancel Buttons:** Click OK to accept the entered Sample and Hold time values, or Cancel to close the Setup Remote Active Count window without saving the changes.

## LWS Total Organic Carbon Analyzer

If the administrator has selected the LWS Total Organic Carbon Analyzer for instrument type, the window shown in Figure 10-52 appears when the Driver Options button is clicked.

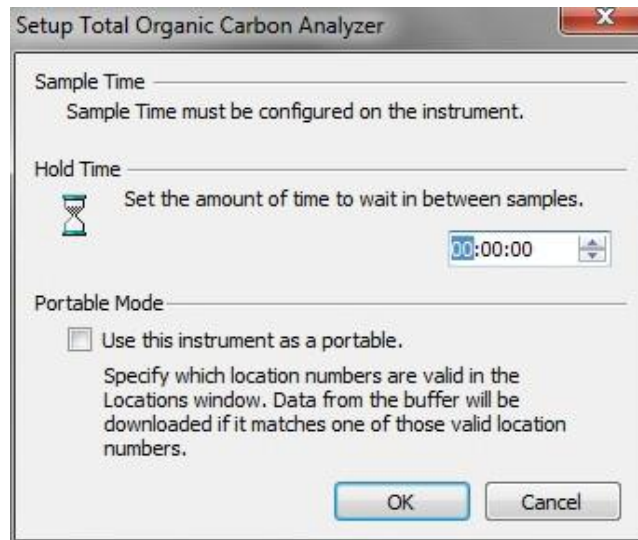


Figure 10-61 Setup Total Organic Carbon Analyzer

On the Setup Total Organic Analyzer window, enter the Sample Time and Hold Time for the instrument.

- **Portable Mode:** When the Portable Mode checkbox is checked, **Express** places the instrument into portable mode. When the instrument is in portable mode, the user has to select which locations numbers are valid. Data from the buffer will be downloaded if it matches one of those valid numbers selected in the locations window.
- **Sample Time:** Sample Time must be configured on this instrument.
- **Hold Time:** Enter the amount of time to hold between samples. The default is 00:00:00 (HH:MM:SS), i.e not to hold between samples.
- **OK/Cancel Buttons:** Click OK to accept the entered Sample and Hold time values, or Cancel to close the Setup Total Organic Carbon Analyzer window without saving the changes.

## **Modifying a COM Port, Network Connection, or Instrument**

To modify an existing COM Port, Network Connection, or Instrument, select the COM Port or Instrument in the Instrument Tree and click the Setup button on the toolbar. The appropriate setup window appears, allowing administrators to edit information about the COM Port, Network Connection, or Instrument.

When the administrator has finished reviewing or updating the COM Port, Network Connection or Instrument, clicking OK saves the changes and closes the window.

## **Disabling a COM Port, Network Connection, or Instrument**

To disable a COM Port, Network Connection, or Instrument, select the COM Port or Instrument in the Instrument Tree and click Disable Connection or Stop Instrument (as appropriate) on the Real Time Data Task Panel.

After disabling a COM Port, Network Connection or Instrument, the Instrument Tree updates and the icon for the COM Port, Network Connection or Instrument includes a red X.

## **Deleting a COM Port, Network Connection, or Instrument**

To delete a COM Port, Network Connection, or Instrument, select the item in the Instrument Tree and click the Delete toolbar button or “Remove Connection” or “Remove Instrument” from the Real Time Data Collection Task Panel.

The Instrument Tree updates and the deleted COM Port, Network Connection, or Instrument is no longer displayed in the Instrument Tree.



**Blank Page**

# Chapter 11 Configuration Manager

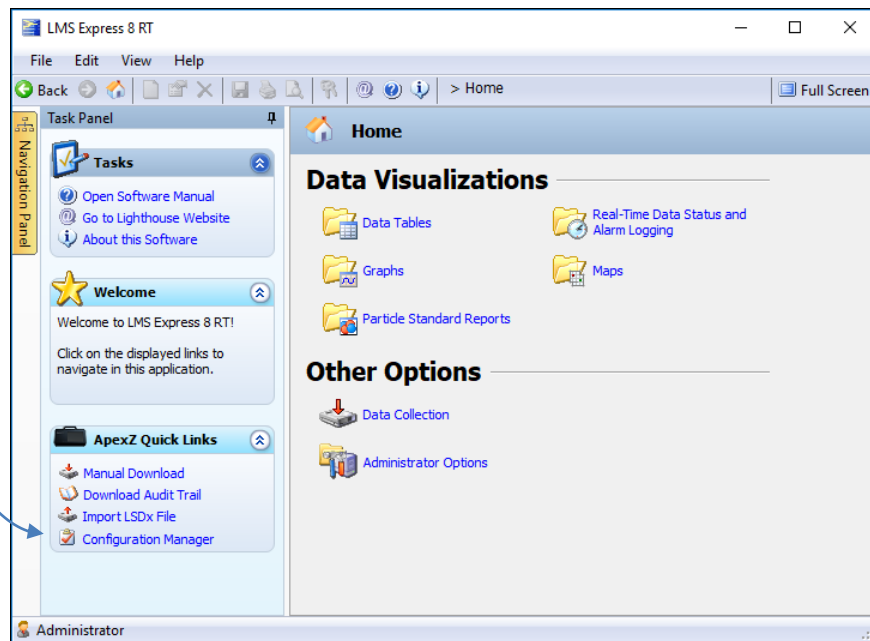
**Note:** LMS Express Configuration Manager is only compatible with ApexZ firmware 1.01 and is not compatible with ApexZ FW 2.0 or above. Use LMS XChange software to manage ApexZ configuration files with firmware versions 2.0 or above.

The LMS Express Configuration Manager allows a user to edit an ApexZ configuration directly from Express and then save it back to the instrument. In addition Configuration Manager can download configurations from ApexZ instruments, name and save the configuration file in Express.

LMS Express Configuration Manager is only compatible with ApexZ firmware 1.01 and is not compatible with ApexZ FW 2.0 or above. Use LMS XChange software to manage ApexZ configuration files with firmware versions 2.0 or above.

Saved ApexZ configurations in Express can be modified, or uploaded onto one or more ApexZ instruments.

From the Home screen Task Panel press **Configuration Manager** within the ApexZ Quick Links section.



**Figure 11-1 LMS Express Home Screen**

**Note:** ApexZ configuration files will be saved in the root folder:  
C:\LMS Express 8\Configs

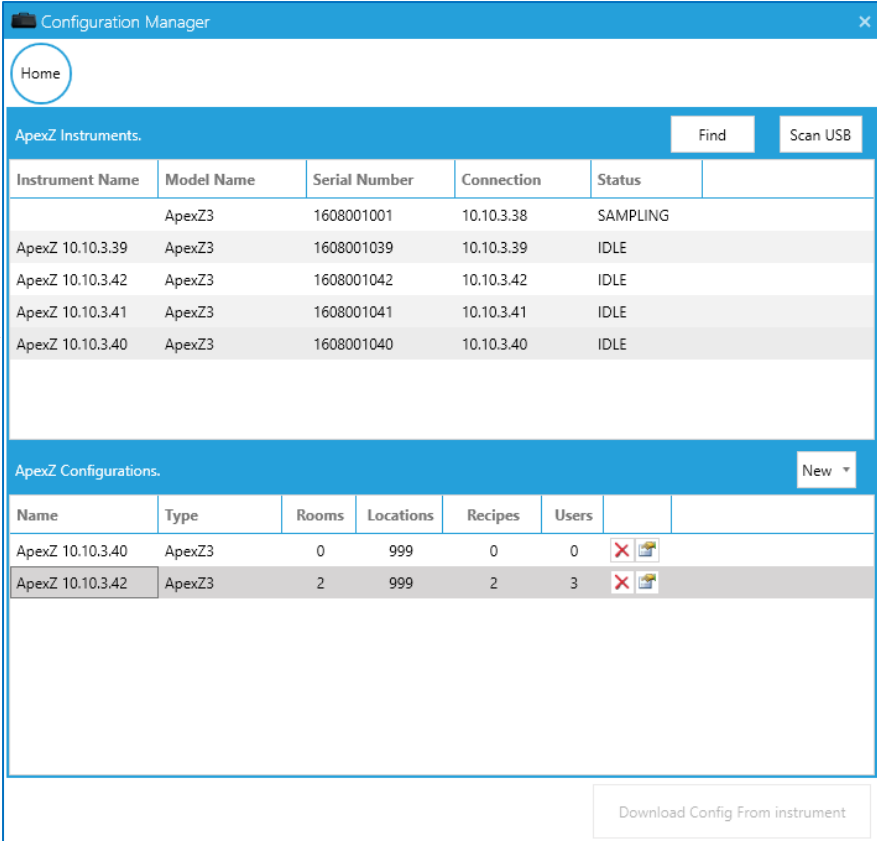
## Configuration Manager Home Screen

ApexZ Instruments detected on the network through Ethernet, Wi-Fi or serial (using the ApexZ micro USB port) will appear in the ApexZ Instruments section of the Configuration Manager Home page.

Saved ApexZ configuration files will appear in the ApexZ Configurations section of the Configuration Manager home page. Click on a detected ApexZ Instrument and it will highlight indicating it has been actively selected. Click on a saved configuration file and it will highlight indicating it has been selected.

**Detected ApexZ Instruments**

**Saved ApexZ Configurations**







The screenshot shows the Configuration Manager Home Screen. It has a blue header bar with the title 'Configuration Manager' and a 'Home' button. Below the header, there are two main sections: 'ApexZ Instruments' and 'ApexZ Configurations'.

The 'ApexZ Instruments' section has a 'Find' button and a 'Scan USB' button. It contains a table with the following data:

Instrument Name	Model Name	Serial Number	Connection	Status
	ApexZ3	1608001001	10.10.3.38	SAMPLING
ApexZ 10.10.3.39	ApexZ3	1608001039	10.10.3.39	IDLE
ApexZ 10.10.3.42	ApexZ3	1608001042	10.10.3.42	IDLE
ApexZ 10.10.3.41	ApexZ3	1608001041	10.10.3.41	IDLE
ApexZ 10.10.3.40	ApexZ3	1608001040	10.10.3.40	IDLE

The 'ApexZ Configurations' section has a 'New' button. It contains a table with the following data:

Name	Type	Rooms	Locations	Recipes	Users	
ApexZ 10.10.3.40	ApexZ3	0	999	0	0	 
ApexZ 10.10.3.42	ApexZ3	2	999	2	3	 

At the bottom right of the screen, there is a button labeled 'Download Config From instrument'.

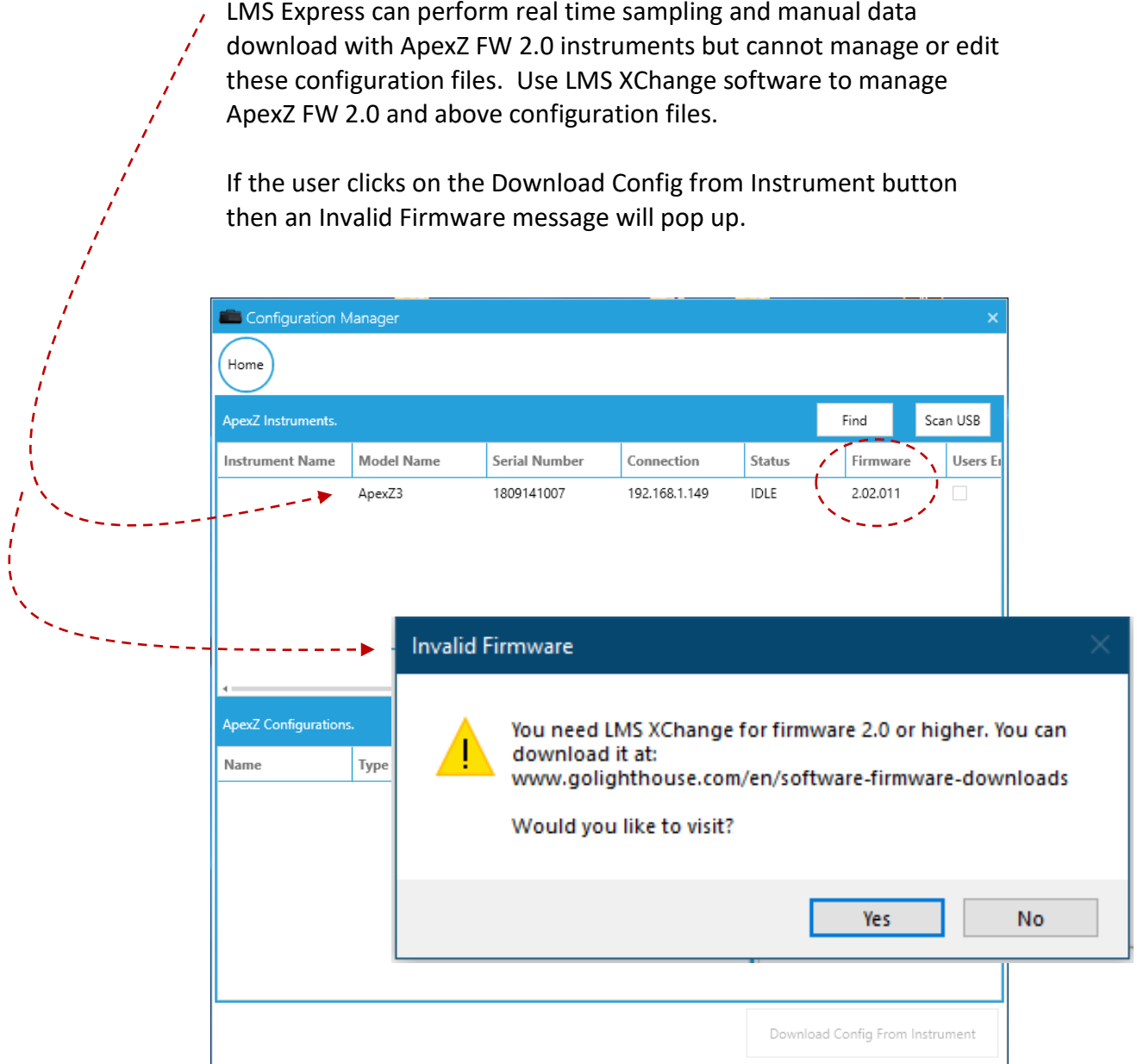
Figure 11-2 Configuration Home Page

## ApexZ FW version 2.0 and above

LMS Express Configuration Manager and Audit Trail Download are only compatible with ApexZ firmware 1.01 and are not compatible with ApexZ FW 2.0 or above.

LMS Express can perform real time sampling and manual data download with ApexZ FW 2.0 instruments but cannot manage or edit these configuration files. Use LMS XChange software to manage ApexZ FW 2.0 and above configuration files.

If the user clicks on the Download Config from Instrument button then an Invalid Firmware message will pop up.

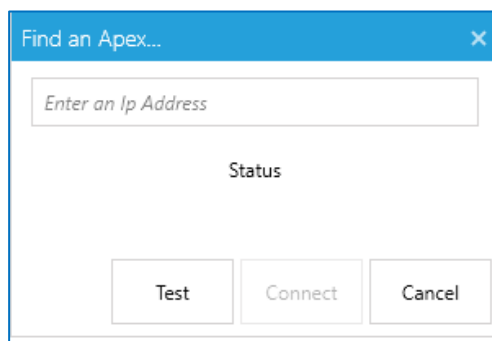


## Find ApexZ instrument

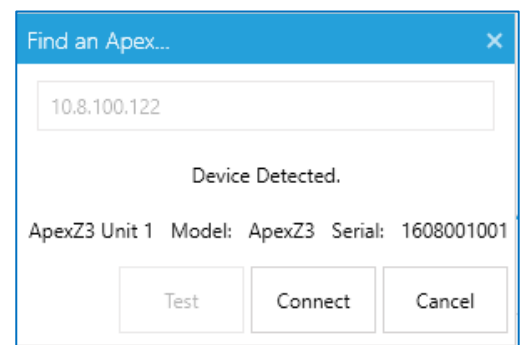
---

If the ApexZ instrument you are looking for is connected to the network but is not detected or displayed then it may be found pressing the Find button and entering the IP Address of the instrument.

Click on the Find button to locate a connected ApexZ instrument.  
Enter the ApexZ Instrument IP address and click on the Test button.



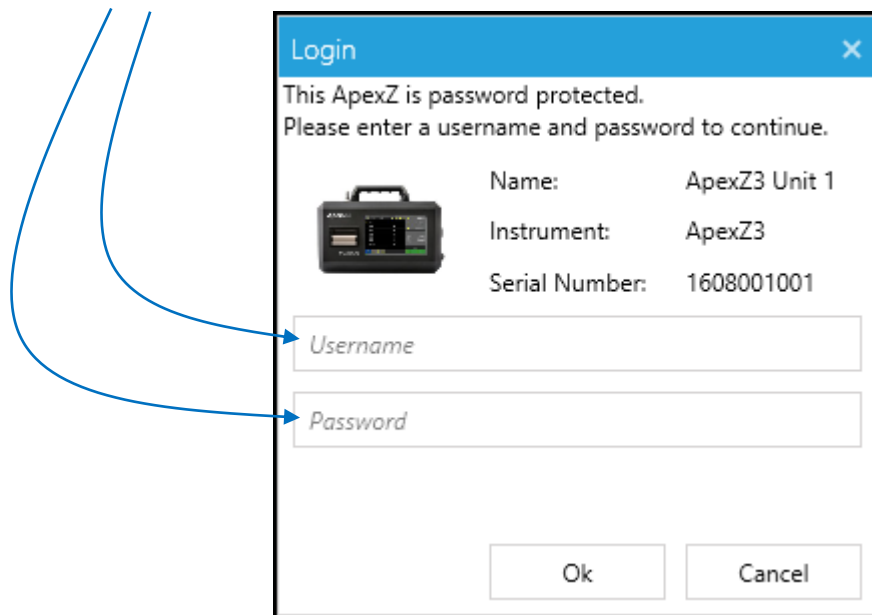
**Figure 11-3 Find ApexZ by IP address**



**Figure 11-4 Device Detected**

When the device is detected, click on the Connect button.

If Users are enabled on the detected ApexZ device then a login screen will pop up and require Username and Password to be entered for that unit.

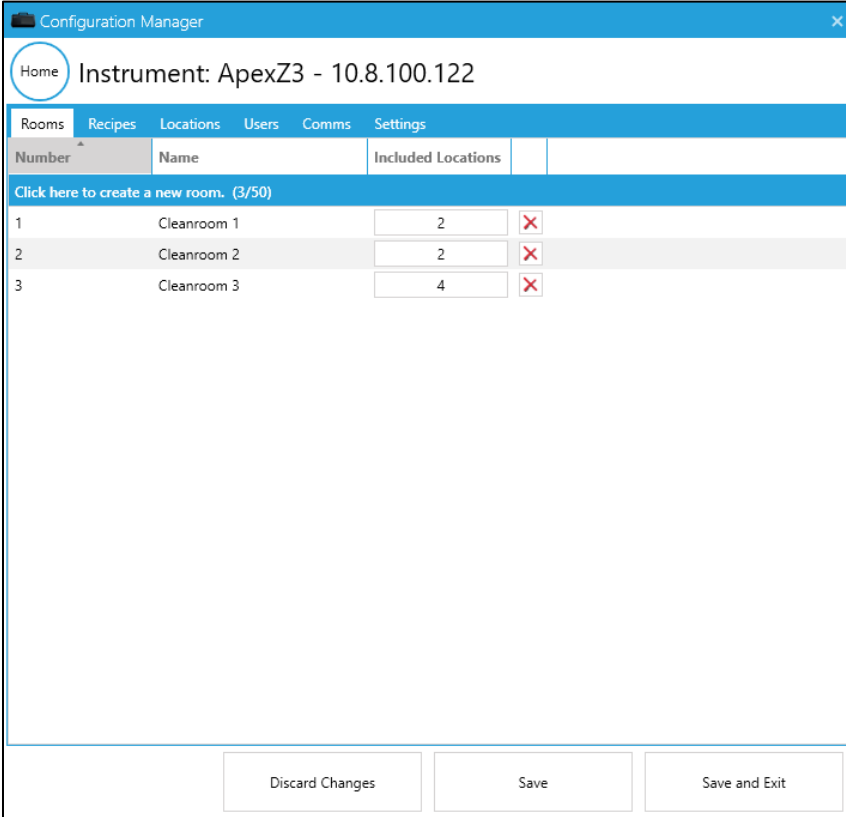


**Figure 11-5 Login to ApexZ**

Enter the Administrator level Username and Password to login and gain access to that ApexZ for Configuration Manager.

Click on the OK button.

Express will find and display the ApexZ instrument configuration screen (figure 11-6). This screen provides direct access to edit the ApexZ configuration.

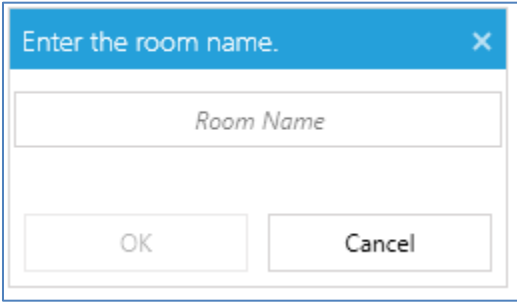


Number	Name	Included Locations
1	Cleanroom 1	2
2	Cleanroom 2	2
3	Cleanroom 3	4

**Figure 11-6 Edit ApexZ Instrument Configuration**

### Add or edit room name and included locations

Add a new Room by clicking on the blue bar “Click here to create a new room”. Enter the room name from the pop up and click OK (figure 11-7).

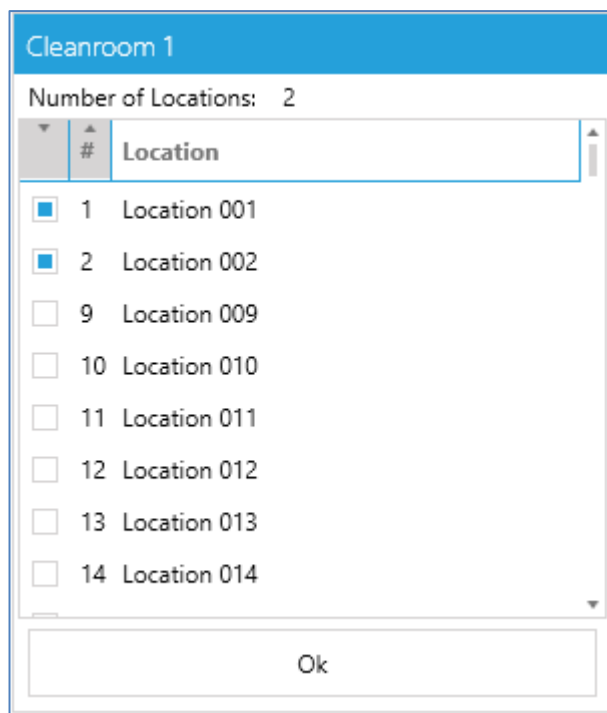


**Figure 11-7 Enter new room name**

Edit the room name by double clicking in the room name column and editing in the room name box.

Edit included locations by clicking once on the included locations button showing total number of locations for that room name. After clicking the location button the total locations list (figure 11-8) will appear and those locations included for this room name will be check marked.

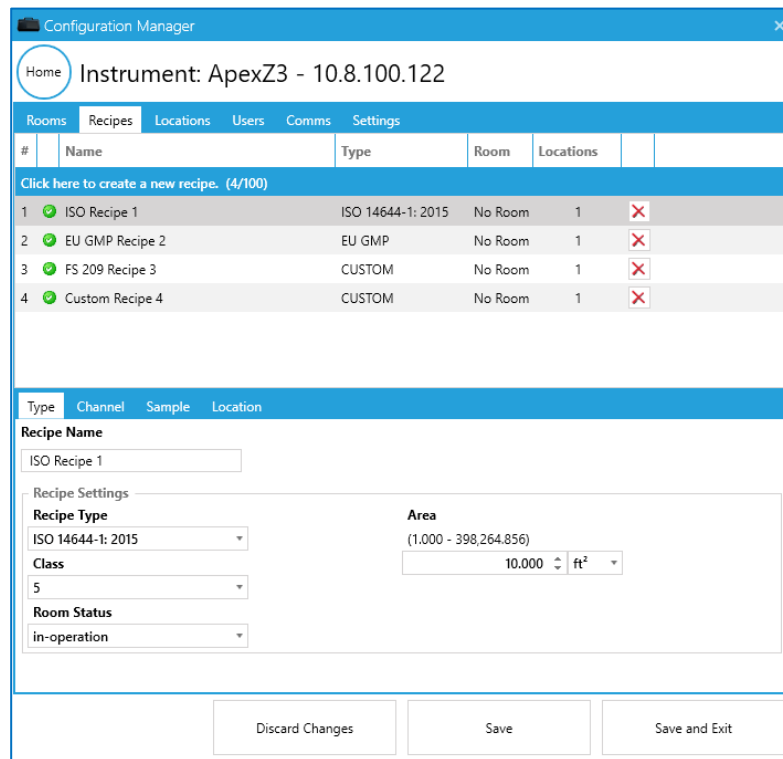
Check or uncheck the location boxes to include or not include locations in the specified room.



**Figure 11-8 Modify Locations**



## Add or Edit Recipes



Configuration Manager

Home Instrument: ApexZ3 - 10.8.100.122

Rooms Recipes Locations Users Comms Settings

#	Name	Type	Room	Locations	
Click here to create a new recipe. (4/100)					
1	ISO Recipe 1	ISO 14644-1: 2015	No Room	1	✗
2	EU GMP Recipe 2	EU GMP	No Room	1	✗
3	FS 209 Recipe 3	CUSTOM	No Room	1	✗
4	Custom Recipe 4	CUSTOM	No Room	1	✗

Type Channel Sample Location

Recipe Name

ISO Recipe 1

Recipe Settings

Recipe Type

ISO 14644-1: 2015

Class

5

Room Status

in-operation

Area

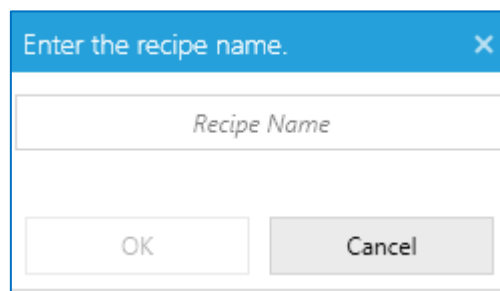
(1,000 - 398,264.856)

10,000 ft<sup>2</sup>

Discard Changes Save Save and Exit

**Figure 11-9 Edit Recipe**

Add a new Recipe by clicking on the blue bar “Click here to create a new Recipe”. A pop up window will prompt the user to enter the recipe name. (figure 11-10).



Enter the recipe name. ✕

Recipe Name

OK Cancel

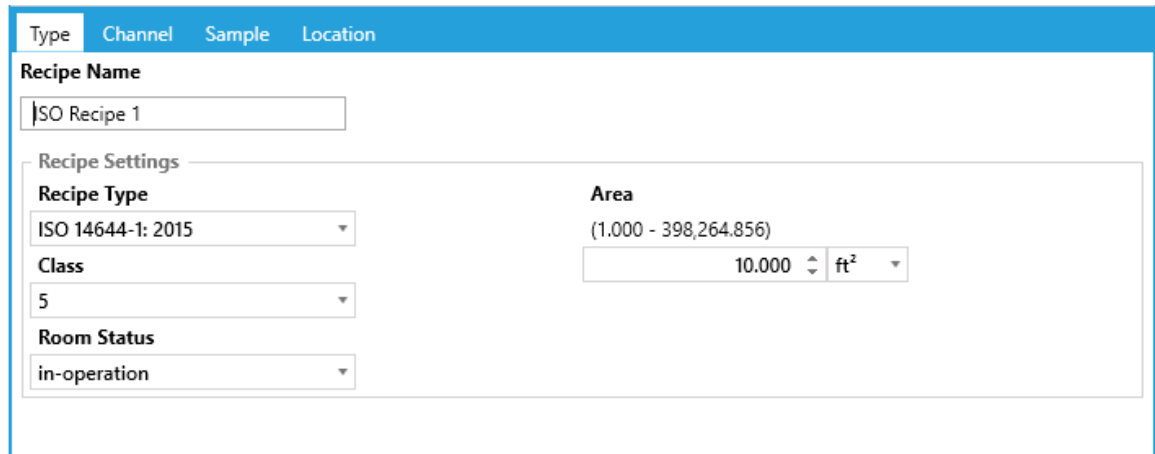
**Figure 11-10 Enter Recipe Name**

- Enter new recipe name and press OK.
- Configuration Manager will create a new “Custom” type recipe.
- The user may edit the recipe and select any recipe type.

## Edit Recipe Type

Click on the Type tab to display the recipe type settings.

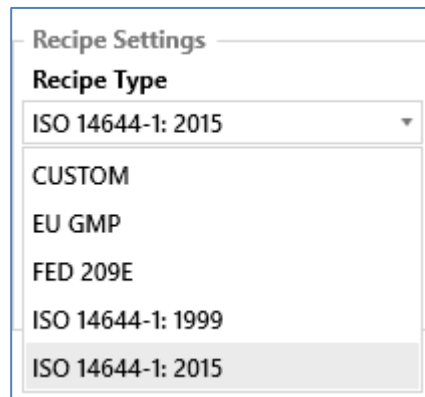
Edit the Recipe Name by typing over the Recipe Name input box.



The screenshot shows a web interface for editing a recipe. At the top, there are four tabs: 'Type', 'Channel', 'Sample', and 'Location'. The 'Type' tab is selected. Below the tabs, there is a 'Recipe Name' input field containing 'ISO Recipe 1'. Underneath, a 'Recipe Settings' section is expanded, showing three dropdown menus: 'Recipe Type' (set to 'ISO 14644-1: 2015'), 'Class' (set to '5'), and 'Room Status' (set to 'in-operation'). To the right of these, there is an 'Area' field with a range '(1.000 - 398,264.856)', a numeric input '10.000', and a unit dropdown set to 'ft²'.

Figure 11-11 Edit Recipe

Edit the Recipe Type by selecting from the pull down list (figure 11-11).



This screenshot shows the dropdown menu for the 'Recipe Type' field. The menu is open, displaying a list of options: 'ISO 14644-1: 2015', 'CUSTOM', 'EU GMP', 'FED 209E', 'ISO 14644-1: 1999', and 'ISO 14644-1: 2015'. The last option, 'ISO 14644-1: 2015', is highlighted with a grey background.

Figure 11-12 Edit Recipe Type

Edit the Class from the pull down list.

Edit the Room Status from the pull down list and select “as built”, “at rest” or “in operation”.

Edit the Area and select the units’ ft<sup>2</sup> or m<sup>2</sup>.

Edit Recipe Channels

Click on the Channel tab to display the Recipe Channel and Target Limits.

**Note:** Custom Recipe types allow particle count target limits to be set by the user for both warning and alarm thresholds.

Certification Recipes will display a single target limit per channel size. Target limits are fixed and cannot be changed by the user.

The screenshot shows the 'Configuration Manager' window for 'Instrument: ApexZ3 - 10.8.100.122'. The 'Recipes' tab is active, displaying a list of recipes. A red arrow points from the 'Channel' tab in the sub-header to the 'Channel' tab in the main header. The 'Channel' tab is selected, showing a table of particle sizes and their corresponding target limits.

Size	Target Limit / m <sup>3</sup>
0.3 µm	10200
0.5 µm	3520
1.0 µm	832
3.0 µm	
5.0 µm	
10.0 µm	

Buttons at the bottom: Discard Changes, Save, Save and Exit.

Figure 11-13 Channel Settings ISO Class 5 Recipe

The screenshot shows the 'Configuration Manager' window for 'Instrument: ApexZ3 - 10.8.100.122'. The 'Recipes' tab is active, displaying a list of recipes. A red arrow points from the 'Channel' tab in the sub-header to the 'Channel' tab in the main header. The 'Channel' tab is selected, showing a table of particle sizes and their corresponding warning and alarm thresholds.

Size	Warning	Alarm
0.3 µm	0	0
0.5 µm	0	0
1.0 µm	0	0
3.0 µm	0	0
5.0 µm	0	0
10.0 µm	0	0

Buttons at the bottom: Discard Changes, Save, Save and Exit.

Figure 11-14 Channel Settings default for Custom Recipe

Click on the enable button to the right of the channel size to enable or disable that channel size for this recipe. A blue highlight indicates the channel is enabled for this recipe.

Click on the Target limit to edit the value.

### Edit Recipe Sample Settings

Click on the Sample tab to display and edit the sample settings for Delay time, Sample time, Hold time, # of Cycles, sample volume and volume units.

Type	Channel	Sample	Location
<b>Delay</b> (0:00:00 - 23:59:59)		<input type="text" value="0:00:00"/> <input type="button" value="🕒"/>	<b>Cycles</b> (1 - 99) <input type="text" value="1"/> <input type="button" value="⬆"/> <input type="button" value="⬇"/> <input type="button" value="⬆"/> <input type="button" value="⬇"/>
<b>Sample Time</b> (00:01:00 - 23:59:59)		<input type="text" value="0:01:00"/> <input type="button" value="🕒"/>	<b>Volume</b> (28.310 - 40,765.927) <input type="text" value="28.310"/> <input type="button" value="⬆"/> <input type="button" value="⬇"/> <input type="button" value="⬆"/> <input type="button" value="⬇"/>
<b>Hold</b> (0:00:00 - 23:59:59)		<input type="text" value="0:00:00"/> <input type="button" value="🕒"/>	<input type="text" value="L"/> <input type="button" value="⬆"/> <input type="button" value="⬇"/> <input type="button" value="⬆"/> <input type="button" value="⬇"/>

**Figure 11-15 Sample settings for Recipe**

**Note:** When Sample Time is changed then Volume will adjust automatically and accordingly.

When Volume is changed then Sample Time will be adjusted automatically and accordingly.

Click on the Delay input button to enter a delay time 0 – 23:59:59 hours before the recipe sample time will start.

Click on the Sample Time input button and enter a sample time for the recipe (1 minute to 23:59:59).

Click on the Hold input button to enter a hold time 0 – 23:59:59 hours between sample cycles.

Click on the Cycles input button to enter the number of cycles to sample at each location.

Click on the volume units' button and select ft<sup>3</sup>, m<sup>3</sup> or L.

### Edit Recipe's Room and Locations

Click on the location tab to display the room and locations included in this recipe.

Click on the room pull down list and select the room for this recipe.

Click on the check boxes to include or not include that location in the Recipe.

Double click on a location name to rename it.

Type	Channel	Sample	Location
Min Locations: 1			
Locations: 1 / 999			
Room : No Room			
#	Location		
<input checked="" type="checkbox"/>	1 Location 001		
<input type="checkbox"/>	2 Location 002		
<input type="checkbox"/>	3 Location 003		
<input type="checkbox"/>	4 Location 004		
<input type="checkbox"/>	5 Location 005		
<input type="checkbox"/>	6 Location 006		
<input type="checkbox"/>	7 Location 007		

**Figure 11-16 Edit Recipe's Room and Location**

## Edit Instrument Locations

Click on the Locations tab to edit ApexZ location names and assigned rooms.

Configuration Manager

Home Instrument: ApexZ3 - 10.8.100.122

Rooms Recipes Locations Users Comms Settings

Number	Name	Room
1	Location 001	Cleanroom 1
2	Location 002	Cleanroom 1
3	Location 003	Cleanroom 2
4	Location 004	Cleanroom 2
5	Location 005	Cleanroom 3
6	Location 006	Cleanroom 3
7	Location 007	Cleanroom 3
8	Location 008	Cleanroom 3
9	Location 009	No Room
10	Location 010	No Room
11	Location 011	No Room
12	Location 012	No Room
13	Location 013	No Room
14	Location 014	No Room
15	Location 015	No Room
16	Location 016	No Room

Page 1 of 10

Discard Changes Save Save and Exit

**Figure 11-17 Edit Instrument Location and Room**

Locations are considered sampling points and each location (1-999) can be renamed by double clicking on the location name and typing over.

Locations can be only be assigned to one Room.

Click on the pull down list for Room names to select the room for each location.

## Add a New User

**Note:** If Users are enabled on the ApexZ instrument when Configuration Manager connects, a username and password will be required to login.

Click on the Users tab to display the saved user names.

The screenshot shows the 'Configuration Manager' window with the 'Users' tab selected. The window title is 'Instrument: ApexZ3 - 10.8.100.122'. The 'Users' tab is highlighted in the top navigation bar. Below the navigation bar is a table with columns: Username, Type, User Group, First Name, Last Name, Password, and a red 'X' icon. The table contains three rows: ADMIN, Power User 1, and Operator 1. Below the table is a blue bar with the text 'Click here to create a new user. (3/50)'. At the bottom of the window are three buttons: 'Discard Changes', 'Save', and 'Save and Exit'.

Username	Type	User Group	First Name	Last Name	Password	
ADMIN	local	Administrator	Michael	Smith	Set Password	✗
Power User 1	local	Power User	Joe	Smith	Set Password	✗
Operator 1	local	Operator	Brandon	Jones	Set Password	✗

Figure 11-18 Edit Users

Click on the blue bar "Click here to create a new user".

The screenshot shows the 'New User' dialog box. It has a blue title bar with the text 'New User'. The dialog contains the following fields and controls:

- Type \***: A dropdown menu with 'local' selected.
- Username \***: A text input field with placeholder text 'Enter Username'.
- Level \***: A dropdown menu with 'Administrator' selected.
- Name \***: Two text input fields, 'First Name' and 'Last Name', with placeholder text.
- Password \***: Two text input fields, 'New Password' and 'Retype Password', with placeholder text.
- At the bottom are two buttons: 'OK' and 'Cancel'.

Figure 11-19 Add New User

### Local User

Select the User Type “Local” for users accounts stored locally on the ApexZ instrument.

Enter User Name.

Select Level, (Administrator, Power User or User).

Enter First Name.

Enter Last Name.

Enter Password and Retype Password to confirm.

### AD User – Active Directory

Select User Type AD (Active Directory) for user accounts on the Network Active Directory.

No password is required for AD user accounts. The password will be asked at login time and then validated against the connected network active directory account.

Enter User Name.

Select Level, (Administrator, Power User or User).

Enter First Name.

Enter Last Name.

Enter Username, Level, First and Last Name and Password and click OK to save or click Cancel to cancel.



## Edit a User

---

**Note:** Only a logged in Administrator can edit a User's Group level.

A logged in User or Power User level can only change their own first/last name and password.

A logged in User or Power User cannot change his/her User Group level.

Click on the User Group pull down list and edit the User Level for that user.

Double click on the First or Last Name to rename it.

## Edit Comms

Click on the Comms tab to edit the Instrument Print and USB settings.

Configuration Manager

Home Instrument: ApexZ3 - 10.8.100.122

Rooms Recipes Locations Users **Comms** Settings

**Print**

**USB**

**Data**

Cumulative/Diff:  Raw/Norm:

**Statistics**

Mean ☒ Minimum ☒ Maximum ☒ Std. Dev. ☒ Std. Error ☒ 95% UCL ☒

**Formatting**

Model ☒ Serial # ☒ CalDate ☒ Username ☒ Tag ☒ Separator ☒ Company ☒ Address ☒

**Output**

On Sample ☐ On Alarm ☐

**Font Size**

Discard Changes Save Save and Exit

**Figure 11-20 Edit Print Comms**

### Print Comms

Select Cumulative/Differential or both. Select Raw or Norm. Selecting Norm will prompt to select the Normalized Units (ft<sup>3</sup>, m<sup>3</sup>, L)

Check mark the statistics to be included in output; Mean, Minimum, Maximum, Std. Dev. (Standard Deviation), Std. Error and 95% UCL.

Check mark formatting to be included in output: Model, Serial #, CalDate (calibration date), Username, Tag, Separator, Company and Address.

Check mark output On Sample to output after every sample is completed.

Check mark output On Alarm to output after every alarm is triggered.

Select Font Size regular or small from the pull down list.

## USB Comms

Click on the USB side tab to edit the USB Output and Data Format.

Configuration Manager

Home Instrument: ApexZ3 - 10.8.100.122

Rooms Recipes Locations Users Comms Settings

Print

USB

Output

File Format

.csv

☐ On Sample ☐ On Alarm

Data Format

Data Format

Raw

Discard Changes Save Save and Exit

Figure 11-21 Edit USB Comms

**Note:** Output on Sample, Output on Alarm and Data Format are only available for the .csv file format.

Selecting .lsdx will not ask file format or data format.

Select the **File Format** from the pull down list (.csv or .lsdx)

Enable output **On Sample** to output after every completed sample.

Enable output **On Alarm** to output after every alarm is triggered.

Select the Data Format Raw, Norm or both Raw and Norm.

## Edit Settings

Click on the Settings tab to edit Time, Options and About ApexZ.

### Time settings

**Note:** If Daylight savings time is set ON within the System Time then Daylight Savings will enable automatically when the user clicks on Set to System Time and then clicks on Save or Save and Exit.

Check mark Daylight Savings Time to enable.

Click on the **Set to System Time** button to set time to the system clock and to apply the local DST settings.

Select **Date Format** MM/dd/yyyy, dd/MM/yyyy, yyyy-MM-dd.

Select **Time Format** 12 or 24 hour.

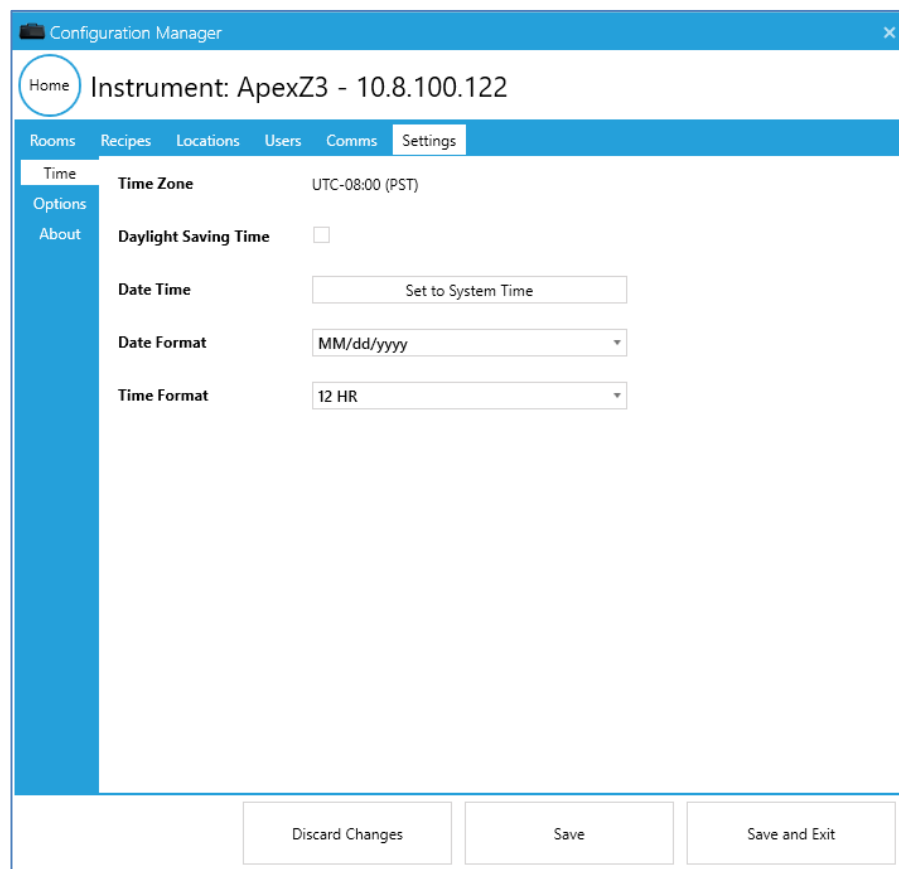


Figure 11-22 Edit Settings Time

Select the **Options** Tab next.

## Options

Click on the **Options** tab to edit the Sample, User and Zero Count options.

Configuration Manager

Home Instrument: ApexZ3 - 10.8.100.122

Rooms Recipes Locations Users Comms **Settings**

Time  
**Options**  
About

Sample

Pump Startup ☐

Disable User Sample Stop ☐

User

Enable Users ☐

Auto Lock ☐

Include Sampling ☐

Timeout (0:01:00 - 23:59:59) 0:05:00

Zero Count

Mode NONE

Sample (0:00:06 - 23:59:59) 0:01:00

Delay (0:00:00 - 23:59:59) 0:00:00

**Figure 11-23 Edit Settings Options**

**Pump Start Up:** Check the box to enable or disable Pump Start up.

Pump Startup Disabled: ApexZ will pause the pump during Delay or Hold times greater than 1 minute.

Pump Startup Enabled: ApexZ will not pause the pump during any Delay or Hold times.

**Note:** Auto Lock only works when Users are enabled. If Users are not enabled then Auto Lock will not function.

**Disable User Sample Stop:** With this option enabled users may not stop a sample once it has started.

**Auto Lock:** With Auto Lock enabled ApexZ will lock the input screen after the Timeout period has elapsed. A login and password will be required to regain access to the ApexZ screen.

**Include Sampling:** Check mark and enable **Include Sampling** to allow auto lock to lock during a sample if the timeout period has expired.

**Timeout:** Enter the timeout period before Auto Lock will engage.

**Zero Count Mode:** Select **SAMPLE** to enable the Zero count feature and display a Zero Count Start/Stop button on the ApexZ Home screen. Select

**NONE** and no Zero count button will be displayed on the Home screen.

**Sample:** Enter the Zero count sample time.

**Delay:** Enter the Delay time before a sample will start.

## About

Click on the **About** tab to view the ApexZ instrument model, serial #, sensor #, calibration due date, (MEAN, MAIN, SIB, Power Firmware).

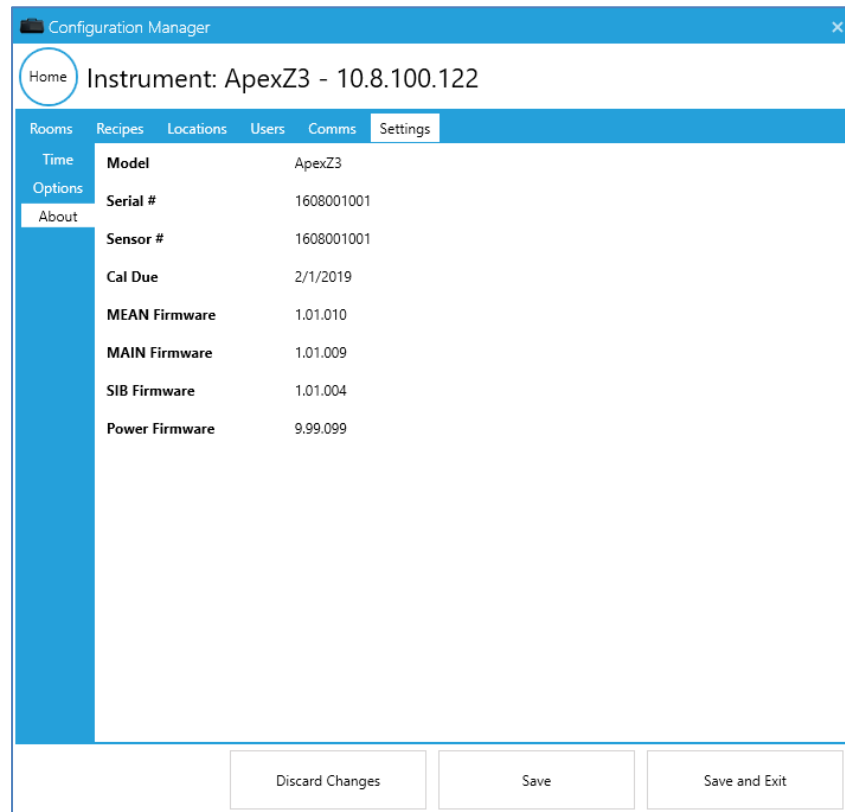
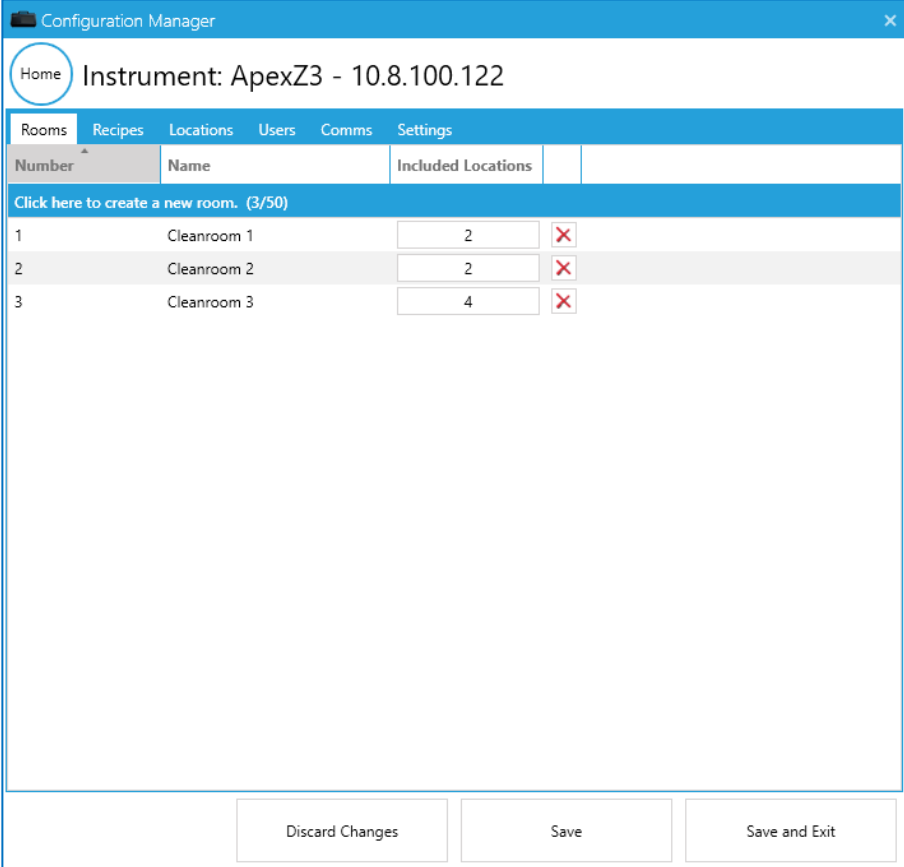


Figure 11-24 View Instrument Settings About

## Save all Settings

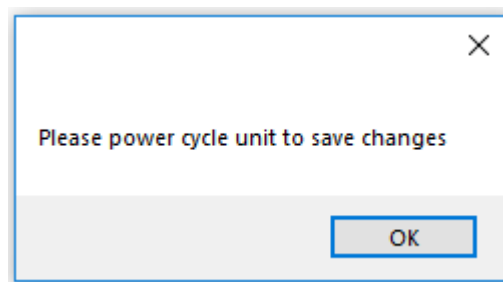


Number	Name	Included Locations	
1	Cleanroom 1	2	X
2	Cleanroom 2	2	X
3	Cleanroom 3	4	X

**Figure 11-25 Save and Exit**

Click the **Save** button to save configuration onto the instrument and remain in Configuration Manager.

Click the **Save and Exit** button to save configuration onto the instrument and exit Configuration Manager and return to Express. This will pop up the Power Cycle Unit to Save Changes window. Click OK



**Figure 11-26 Power Cycle Unit to Save**

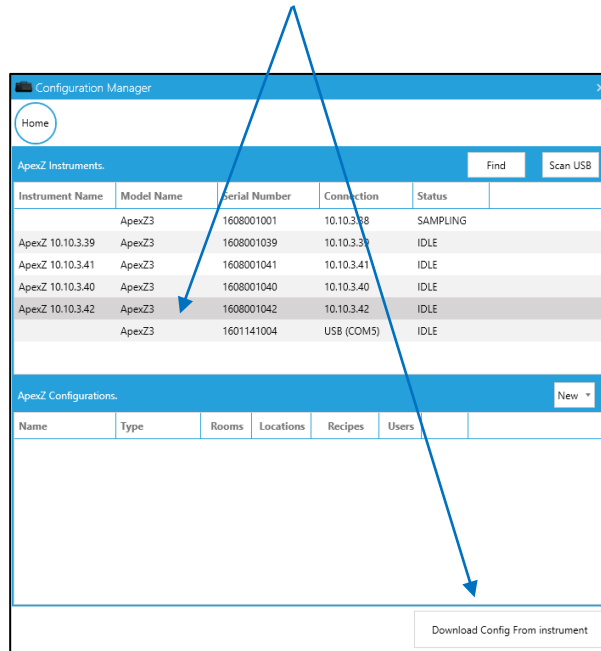
Click **Discard Changes** to exit without saving any configuration edits.

## Download configuration from ApexZ instrument

Select the desired ApexZ Instrument from the list and Click the “**Download Config From Instrument**” button.

**Note:** Configuration will only download when ApexZ is in an idle state.

Configuration will not download if ApexZ is sampling and will give an error message.

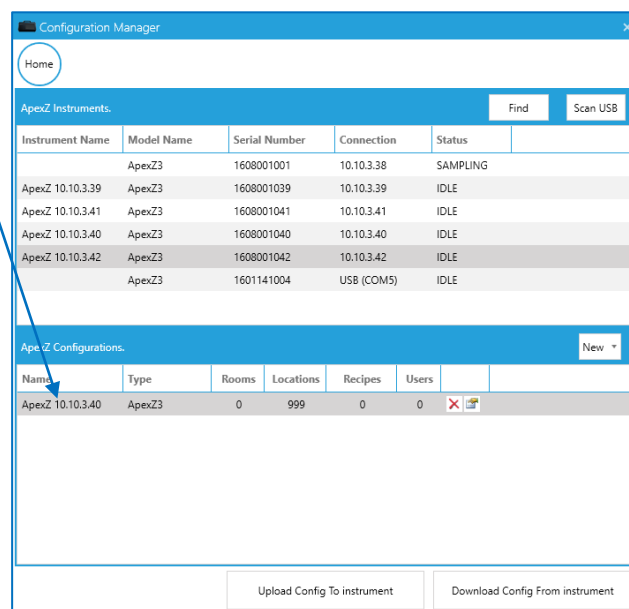


**Figure 11-27 Configuration Manager Home Screen**

The downloaded configuration will be saved under ApexZ Configurations.

**Note:** The Download Config From Instrument button will only display when an ApexZ instrument has been selected.

**Note:** The user cannot download from ApexZ while ApexZ is sampling.



**Figure 11-28 Configuration Manager Home Screen**



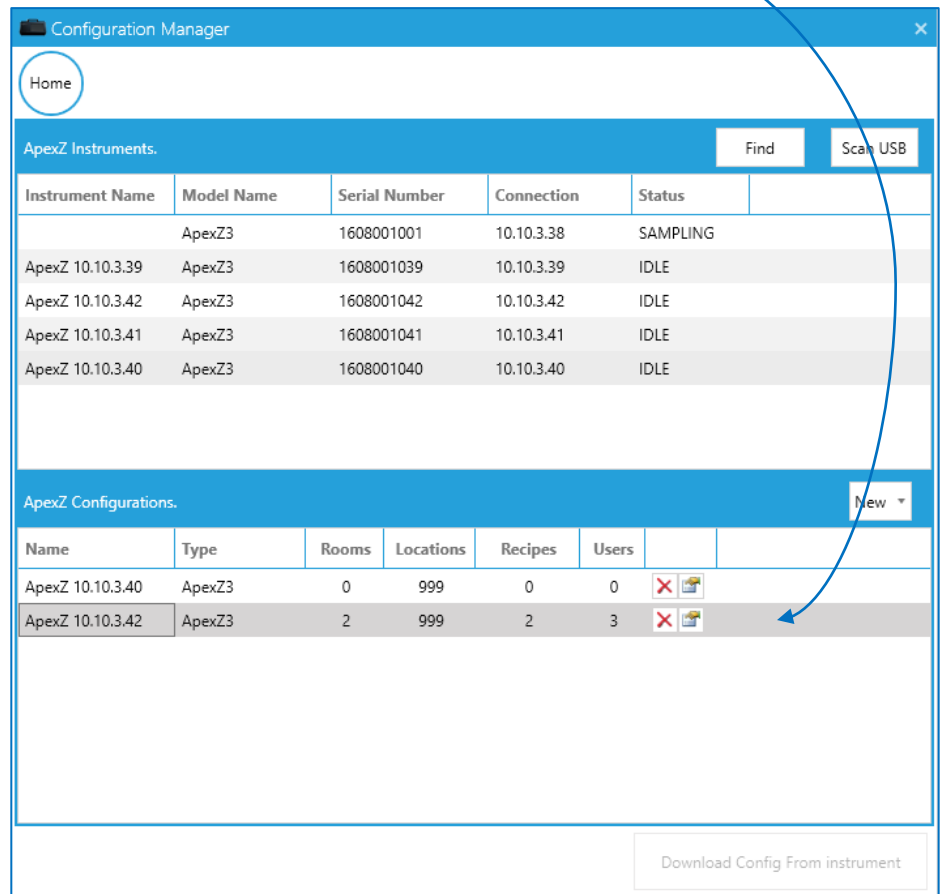
## Modify Saved ApexZ Configuration

ApexZ configurations saved in Express can be modified.

Select the ApexZ Configuration from the lower portion of the Configuration Manager screen.



Click the Edit Configuration File icon button.







**Configuration Manager**

Home

ApexZ Instruments. Find Scan USB

Instrument Name	Model Name	Serial Number	Connection	Status
	ApexZ3	1608001001	10.10.3.38	SAMPLING
ApexZ 10.10.3.39	ApexZ3	1608001039	10.10.3.39	IDLE
ApexZ 10.10.3.42	ApexZ3	1608001042	10.10.3.42	IDLE
ApexZ 10.10.3.41	ApexZ3	1608001041	10.10.3.41	IDLE
ApexZ 10.10.3.40	ApexZ3	1608001040	10.10.3.40	IDLE

ApexZ Configurations. New

Name	Type	Rooms	Locations	Recipes	Users	
ApexZ 10.10.3.40	ApexZ3	0	999	0	0	 
ApexZ 10.10.3.42	ApexZ3	2	999	2	3	 

Download Config From instrument

**Figure 11-29 Modify a Configuration File**

## Rooms

Change room name by double clicking on the room name and editing in the box.

Number	Name	Included Locations
1	Cleanroom 1	3
2	Cleanroom 2	3

**Figure 11-30 Modify Room**

Change included locations by clicking once on the button in the locations column showing total number of locations for that room name. After clicking the location button the total locations list will appear and those locations included for this room name will be check marked. You may check or uncheck the location boxes to include or not include locations in the specified room.

Click Ok to confirm locations included for the room.

Click Save to save and remain in Configuration Manager.

Click Save and Exit to save and exit Configuration Manager.

Click Discard Changes to abort changes made within this configuration.

## Recipes

Modify the Recipe by clicking the Recipe Tab.

The screenshot shows the 'Configuration Manager' window with the 'Configuration: ApexZ 10.10.3.42' title. The 'Recipes' tab is selected, showing a table with two recipes. Below the table, the 'Recipe Name' is 'Recipe 2'. The 'Recipe Settings' section includes 'Recipe Type' (ISO 14644-1: 2015), 'Class' (5), 'Room Status' (in-operation), and 'Area' (10.000 ft²). The 'Area' field has a range of (1.000 - 398,264.856). At the bottom, there are three buttons: 'Discard Changes', 'Save', and 'Save and Exit'.

#	Name	Type	Room	Locations	
1	Recipe 1	CUSTOM	No Room	1	
2	Recipe 2	ISO 14644-1: 2015	No Room	1	

Click here to create a new recipe. (2/100)

Recipe Name: Recipe 2

Recipe Settings

Recipe Type: ISO 14644-1: 2015

Class: 5

Room Status: in-operation

Area: (1.000 - 398,264.856) 10.000 ft²

Discard Changes Save Save and Exit

**Figure 11-31 Modify Recipe**

Modify recipe type, channel sizes enabled, warning and alarm limits (for Custom recipes only), sample parameters, and assigned locations by clicking the corresponding tab and making the changes.

To add a new Recipe click the blue bar that says “Click here to create a new recipe”.

## Locations

Modify locations included in the recipe by clicking the locations tab and check marking the included locations for this recipe.

Number	Name	Room
1	Location 001	Cleanroom 1
2	Location 002	Cleanroom 1
3	Location 003	Cleanroom 1
4	Location 004	Cleanroom 2
5	Location 005	Cleanroom 2
6	Location 006	Cleanroom 2
7	Location 007	No Room
8	Location 008	No Room
9	Location 009	No Room
10	Location 010	No Room
11	Location 011	No Room
12	Location 012	No Room
13	Location 013	No Room
14	Location 014	No Room
15	Location 015	No Room
16	Location 016	No Room

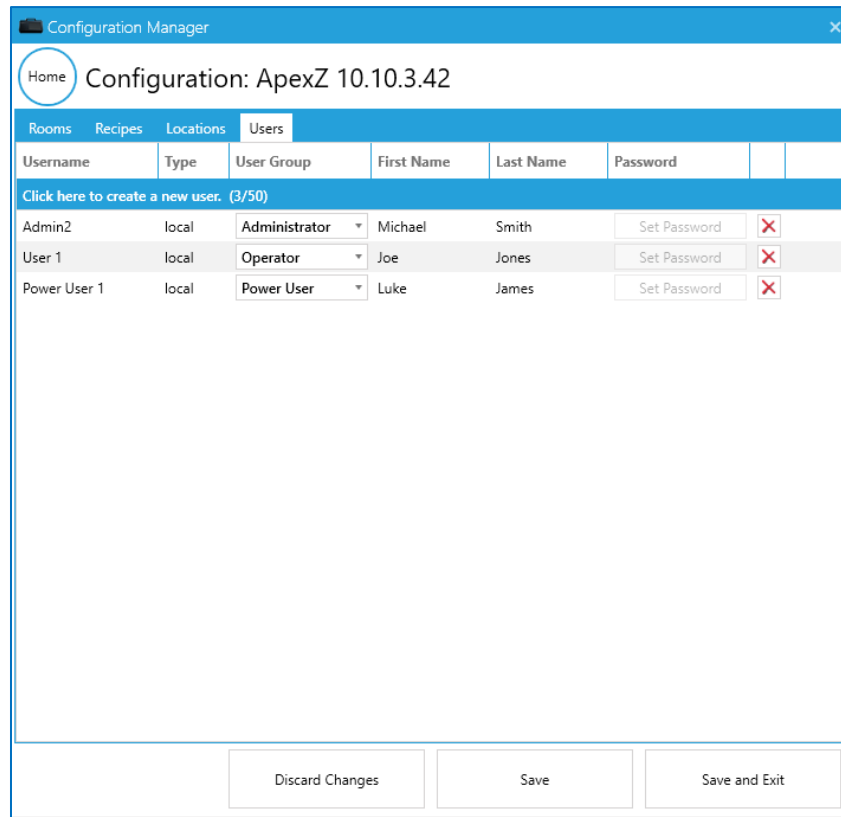
**Figure 11-32 Modify Locations**

Modify the room assigned to each location by clicking the room column pull down list and selecting the room for this location to be included in.

Locations can be only be assigned to one Room.

## Users

Modify users by clicking the User tab.



The screenshot shows the 'Configuration Manager' window with the 'Users' tab selected. The window title is 'Configuration: ApexZ 10.10.3.42'. The 'Users' tab is highlighted in blue. Below the tab, there is a table with columns: Username, Type, User Group, First Name, Last Name, Password, and a red 'X' icon. The table contains three rows of user data. Above the table, there is a link 'Click here to create a new user. (3/50)'. At the bottom of the window, there are three buttons: 'Discard Changes', 'Save', and 'Save and Exit'.

Username	Type	User Group	First Name	Last Name	Password	
Admin2	local	Administrator	Michael	Smith	Set Password	✗
User 1	local	Operator	Joe	Jones	Set Password	✗
Power User 1	local	Power User	Luke	James	Set Password	✗

**Figure 11-33 Modify Users**

Add a new user.

Modify the User Group assigned to the user from the pull down list.

Modify the User First and Last name by selecting and typing over.

Note the password may not be changed.

Press Save to save changes and stay in Configuration Manager

Press Save and Exit to save and exit Configuration Manager.

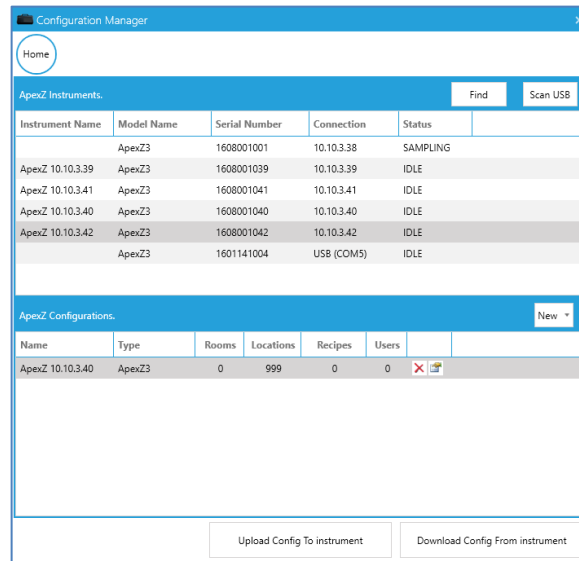
Press Discard Changes to abort changes made within this configuration.

## Upload new configuration to ApexZ instrument

Select the Instrument Name

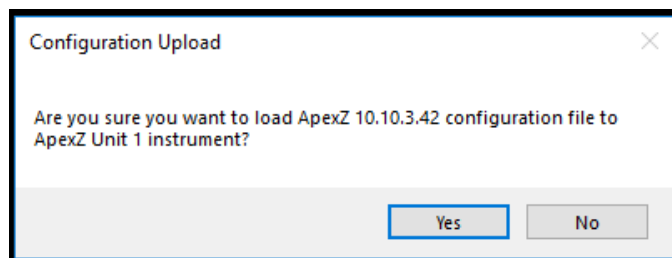
Select the ApexZ Configuration Name

Press the “Upload Config To Instrument” button.



**Figure 11-34 Selecting Instrument and Configuration**

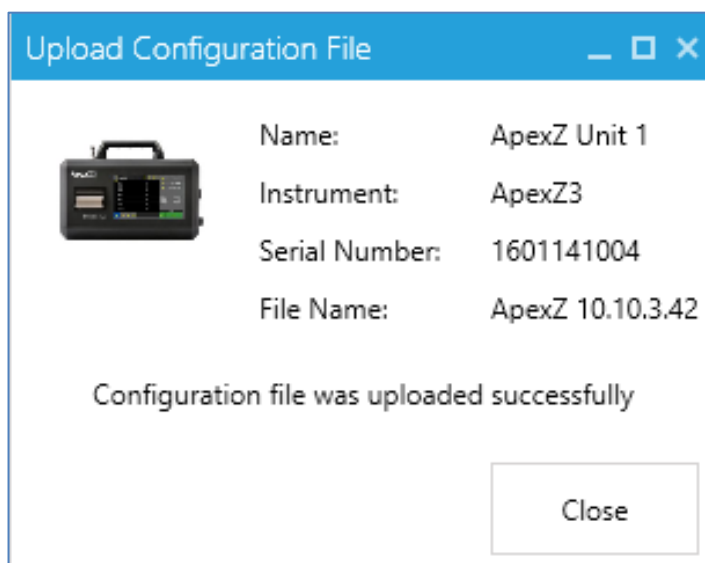
The Configuration Upload popup will request a confirmation to upload.



**Figure 11-35 Selecting Instrument and Configuration**

Click Yes

The Upload Configuration File screen will display “Uploading file...” then “Configuration file was uploaded successfully”.



**Figure 11-36 Uploading configuration file.**

Click Close.

## Conclusion

This completes basic data Real Time Data Collection setup instructions for ***Express***. For additional information, please contact technical support at Lighthouse Worldwide Solutions.



Service and Support  
Tel. 1-800-945-5905 (USA Toll Free)  
Tel. 1-541-770-5905 (Outside of USA)  
[techsupport@golighthouse.com](mailto:techsupport@golighthouse.com)  
[www.golighthouse.com](http://www.golighthouse.com)