LUDLUM MODEL 375
WEBPAGE AND SUPERVISOR SERVICE
SOFTWARE MANUAL

June 2025

Version 1.8.7

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1

Introduction

The Ludlum Model 375 Webpage and Supervisor Service is a radiation network software package that collects and displays radiation levels and alarm status from up to 50 Ludlum Model 375 series area monitors. The Model 375 is a wall-mount digital area monitor that can be equipped with an Ethernet interface. Some area monitors such as the Model 375-10 have Ethernet built in while others can be updated using an Ethernet kit. The Ethernet kit can be installed by the customer, or the area monitors can be sent back to LMI for installation. Using this interface, radiation data may be placed onto the Ethernet network for real-time monitoring, email alerts, and stored into a database for later analysis.

With the Ethernet interface, the area monitor can be connected to the network allowing for real-time monitoring of radiation data, email alerts, and database logging. A standard web browser is used to view the current status and query the data.

The Webpage and Supervisor Service software includes the following components:

- Model 375 Supervisor Service

- ASP Web Application

- SQL Database

- Device Finder

- Service Utility

- Area Monitor Utility

Model 375 Supervisor Service

The Supervisor is a Windows™ service that listens for connections from the area monitors. Once a connection is made, the Supervisor collects and processes the data. Data is logged into a SQL database and can be optionally configured to save data into a comma separated (.CSV) text file. It can also be optionally configured to store a cumulative dose and can be set to automatically reset it at

certain intervals. The Supervisor also sends email alerts when an alarm or failure occurs. It may also be set to purge old data in the database after a given timeframe. The Supervisor currently supports a maximum of 50 area monitors.

ASP Web Application

Hosted on Internet Information Service (IIS), the ASP.NET application provides a web interface to view the current status of each area monitor from any computer that has access to the web server. A floor plan view displays the current status of each instrument overlaid on top of an image of the building's layout. Also available are the incident summary and timeline data for each area monitor. Ten user-defined fields are available to enter comments about the recorded incidents. Comments can be added by clicking on the View button next to each incident.

SQL Database

The data is logged into a Microsoft SQL Server database. This can either be the express or full version of SQL Server. The data are logged at two different intervals. When the instrument isn't alarming or failing, the normal logging interval is used. This is typically a longer time, such as every 5 minutes. When an alarm occurs, data can be logged at a faster interval to capture more data during the event. This interval can be as low as every 2 seconds. On average, a single record is approximately 1000 bytes. Multiply this by the number of instruments logging data and interval to get the database growth rate.

Device Finder

The Device Finder application is used to search the network for any area monitors and display the IP Address and firmware version. Because the Device Finder application uses broadcast UDP to discover the area monitors, search results will typically be limited to the local subnet. A button is provided to open the network settings web page for the Ethernet board to allow the network parameters to be configured.

Service Utility

The Service Utility is used to add and remove area monitors and configure email settings.

Area Monitor Utility

The Area Monitor Utility is used to configure the network settings for area monitors with older Ethernet board firmware versions. There are currently two Ethernet firmware versions available. Version 39801N11 requires the Area Monitor Utility to configure the Ethernet settings. The Ethernet settings of version 39801N12 and later are configured by entering the Area Monitor's IP address in a web browser.

Section

2

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Section
3

Installation

The Webpage and Service software is comprised of four main components:

- Model 375 Series Area Monitors. These are wall-mounted and connected to the local network.

- Supervisor service. A Windows service that collects data from the area monitors and stores the data in an SQL database. It is also responsible for sending email alerts.

- SQL database. This database contains records logged by the service. The ASP.NET web application queries this database to display information.

- IIS web application. This is comprised of several web pages that display current status, background data, and incidents.

The installation should be completed in the following order:

1. Network area monitors

2. Install SQL Server

3. Install IIS

4. Install Model 375 Webpage and Supervisor Service

Network Diagram

Model 375 Area Monitors

Client PC1
Web browser

Client PC2
Web browser

Network

Software can be installed on a single computer or on different computers.

IIS and SQL database do not have to reside on the same computer as the Supervisor service.

Server (SQL only)   Server (LMI, IIS, SQL)   Server (IIS only)
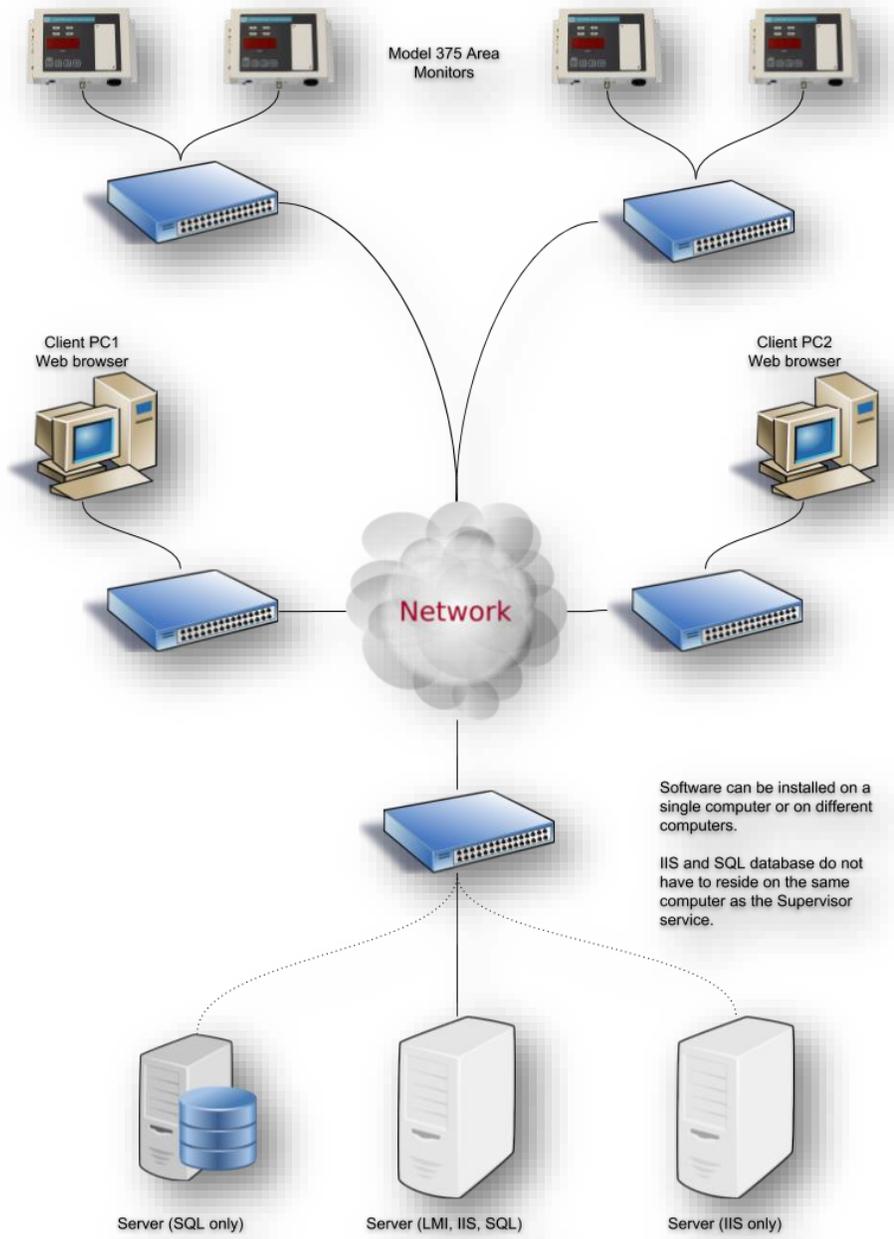
Installation Overview

1. Install SQL Server (Full or Express) using the default options making sure to enable SQL authentication.

2. Install SQL Server Management Studio (SSMS).

3. Install IIS with the following options:

    a. IIS 6 Management Compatibility

    b. IIS Management Scripts and Tools

    c. World Wide Web Services\Application Development Features\ASP.NET 4.0 or higher

4. Install the Web page software (1370-077_Model_375_Web-1.7.3.exe)

5. Connect each monitor to the network and configure network settings pointing the primary and secondary IP address fields to the IP address of the computer running the software installed in Step 3.

6. Run the Service Utility as an Administrator.

7. Click Add New Model 375 Unit.

8. Fill in the serial number, Site, Building, Area, and Location.

9. Make sure that Save to Database and Channel Enabled are checked.

10. Adjust the Normal and Alarm log intervals. Recommend setting the Normal log interval to a minimum of 60 seconds.

11. Click Save Settings (this tab only).

12. Double-click on the Model 375 Web shortcut on the desktop. This should open the web browser and show the Current Status page with the newly added monitor. The monitor status should change to OK within 30 to 60 seconds.

13. Repeat Steps 7 through 11 for each additional monitor.

14. If performing an upgrade from a version prior to 1.7.3, run the UpgradeAreaMonitorTable.sql from SQSS to update the table.

Area Monitor Network Installation

The network specifications for the area monitors are:

- 10 MB half or 100 MB full duplex network port

- Static or dynamic IP address

- User-defined TCP port for communication (50000-59999)

Configuring the Network Settings

The network settings are changed by opening a web browser to the IP address of the instrument. By default, the area monitors are set to use a dynamic IP address. When ordering, the network settings can be preset by completing a Network Settings Request Form from our website.

The IP address can be found using the Device Finder utility, which is included with the software on the CD or the zip file. The Device Finder uses a broadcast UDP message to find any listening monitors on the same subnet. If no monitors are found on the same subnet, check to ensure the computer's firewall is not blocking port 20034.

If connected to a network, it is also possible to check the DHCP server to see what IP address is assigned by looking for the MAC address. The MAC address is located on a sticker affixed to the side of the area monitor and begins with 00:90:C2.

Once connected through a web browser, the following settings can be modified:

☢ Serial Number – The unique serial number which should match the number stamped on the area monitor chassis.

☢ IP Address – IP address of the area monitor. If set to 0.0.0.0, the monitor will use DHCP for configuring network settings.

☢ Subnet Mask - Masks the IP address and divides it into a network address and host address.

☢ Gateway – IP Address of the network gateway.

☢ DNS – IP address of the DNS server.

☢ TCP/IP Port – User-defined port number. This is the port that the area monitor will attempt to connect to on the computer running the Supervisor service. The default is 50000.

- ☢ Unit Code – Tells the Supervisor service the display units of the area monitor.

- ☢ Supervisor Primary IP address – IP address of the computer configured as the primary Supervisor. If only one computer is running the Supervisor service, both the primary and secondary should be set to the same IP address.

- ☢ Supervisor Secondary IP address – IP address of the computer designated as the secondary. The area monitor will attempt to connect to his computer if the primary Supervisor cannot be contacted. If only one computer is running the Supervisor service, the primary and secondary should be set to the same IP address.

After making changes, type in the password and click Submit. The default password is "password." This can be changed by filling in the old password, new password, and confirm new password fields.

DHCP Mode
While in DHCP mode, if the area monitor cannot get an IP address from the DHCP server, it will fall back to an address based on the serial number in the 169.254.x.x range. A spreadsheet included on the installation CD and in the zip file allows the fallback IP address to be calculated.

When directly connected to the area monitor while in DHCP mode, it will attempt to reacquire an IP address periodically. During this time, the network settings page will be unresponsive. It takes approximately 15 seconds after power-up to attempt to get an IP address, timeout, and then use the fallback IP address. There will be approximately 1 minute where it uses the fallback IP address before it attempts to get an IP address again.

Software Installation
The software can be installed on a single computer or spread across multiple computers. This allows the database and web application to be hosted on different servers.

Multi-server Installation
Typically, the software is installed on one computer or virtual machine. However, the components can be installed on different servers. For instance, if there is already a dedicated SQL server, the Supervisor service can be configured to store the data on it instead of a local SQL server. The same applies for the web application if there is already an IIS server available.

The installation below will assume that all components are installed on a single computer. The Supervisor Service and Web application all share the same

settings.config file. If the service and web application are installed on different computers, the settings.config file will need to be copied from the computer running the service to the computer running the web application.

Minimum Requirements
The software requirements are in-line with the minimum or recommended requirements that Microsoft defines for their products with the exception of hard drive space. Enough hard drive space should be allocated to allow for the database to increase over time. If using SQL Server Express, the maximum database size is 10 GB.

The software has been tested on Windows 7 up through Windows Server 2016 and SQL Server versions 2008 through 2017. Installation is the same regardless of operating system version.

Database Growth
Database size will depend on how many area monitors are logging data and at what interval. Each record logged is approximately 1000 bytes. To estimate daily growth, take 86400 / normal logging interval * 1000 * number of area monitors.

Installing SQL Server
Install SQL Server using the installer provided by Microsoft. The only requirement is to enable SQL Authentication when prompted. SQL Server Management Studio (SQLSMS) should also be installed to make database maintenance easier.

The database can be created in one two ways. The first way is to run the "CreateDatabase.sql" script located in the SQL Scripts folder in the installation folder using SQLSMS. The second way is to select "Configure SQL Server Express" or "Configure SQL Server" when running the web page software installer.

A database named "lmi_area_monitor" is created along with an SQL user called "ludlum" with password of "areamonitor". The table "area_monitor" is created automatically by the Supervisor service.

Installing IIS
The steps to install IIS will be different depending on the operating system. Refer to applicable operating system documentation for the correct procedure to install IIS. A Windows Operating System CD may be required to complete installation.

IIS Server Required Features
The following are the specific features that need to be installed when setting up IIS for the Web Page and Supervisor service to install and run.

- Internet Information Services

- IIS 6 Management Compatibility

- IIS Management Scripts and Tools

- World Wide Web Services\Application Development Features\ASP.NET 4.0 or higher

After installing IIS, open IIS Manager and select the ISAPI and CGI Restrictions. Make sure both ASP.NET v4.x.x Framework and Framework64 are set to **Allowed**.

Web Page and Supervisor Service Installation

The installer is provided either on CD or as a zip file downloaded from the LMI website. The contents of the files and folders are:

- Docs – The folder containing this manual.

- SQL Scripts – Scripts that can be run with sqlcmd or SQLSMS to create the database, update the database from an older version, or purge old data.

- 1370-077_Model_375_Web.exe – Software installer that will install the Supervisor service, web page application, utility programs, and setup database. The version of the software is included at the end of the file name.

- Area Monitor Utility – Used to configure the network information for older version of Ethernet boards.

- Device Finder – This utility will send a broadcast UDP message on port 20034 and will display the network information and firmware version of any area monitors on the same subnet.

- Convert Serial Number to Fallback IP Address.xlsx – This Excel spreadsheet will convert a given serial number to the fall-back IP address the Ethernet board will use if it is not able to get an IP address from the DHCP server.

Begin the installation by double-clicking on 1370-077_Model_375_Web.exe. For proper installation, the software should be run either as a user with administrator privileges or right-click on the icon and select "Run as administrator."
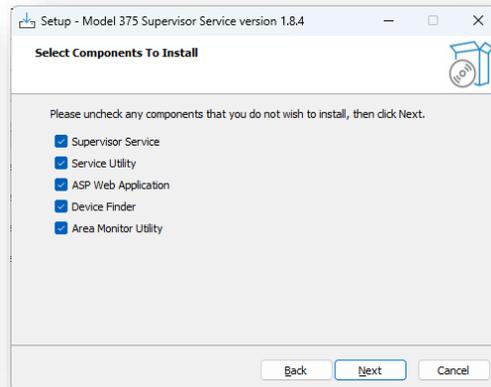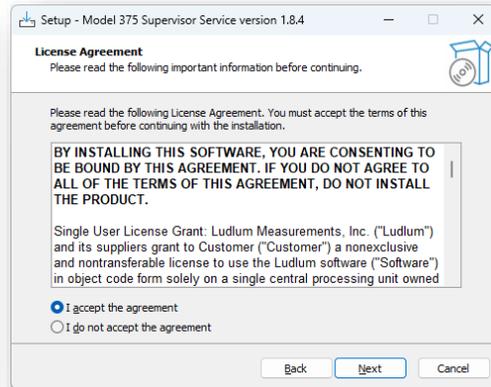
This screen asks to select the components that will be installed on the Supervisor computer. The following is a list of components to install, as well as a short description for each component:

Supervisor Service – The Windows service that runs in the background on the Supervisor computer. The Supervisor service is responsible for collecting Model 375 data and storing that data in a database on the Supervisor computer. It also sends the email alerts.

**Service Utility** – The software used to configure the Supervisor service. From here, monitors can be added to the configuration, and email addresses can be entered for sending email alerts.

ASP Web Application – The software used to run the Model 375 web page. By accessing the URL, the current status for all available monitors can be seen with readings along with background and alarm events.

Device Finder – The software used to search for any Model 375 instruments connected to the local network subnet.

Area Monitor Utility – The software used to detect and configure any Model 375 instruments that are connected to the local network subnet. This is only used for monitors that have older Ethernet firmware 39801N11 or earlier. The N11 firmware was last used in 2009. All firmware versions after are configured by opening a web browser to the IP address of the area monitor.

If the Supervisor service and web application will be installed on different computers, install the service and utilities on the same computer. The computer running web application does not need the utilities installed.
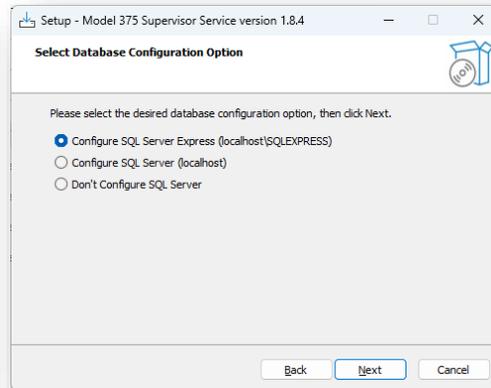
Select which version of the SQL Server was installed. The only difference is the instance name. SQL Server Express uses an instance name of SQLEXPRESS.
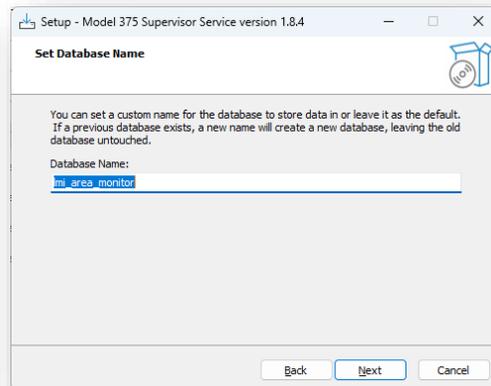
Set the name of the database to create to save the data to or leave it the default value of "lmi_area_monitor". This may be ignored if the SQL Server will not be configured (see previous step).
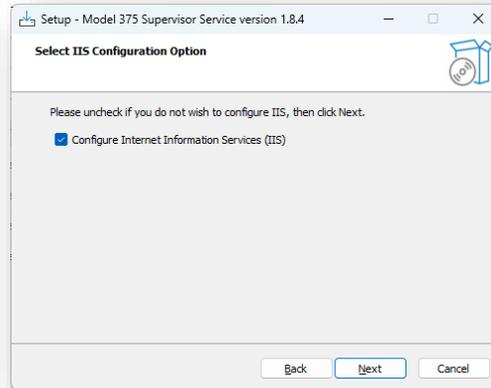
To have the installer automatically configure IIS to run the web application, check this option.
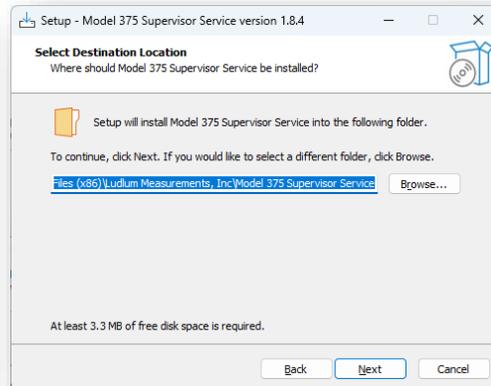
Select the location where the files will be installed.
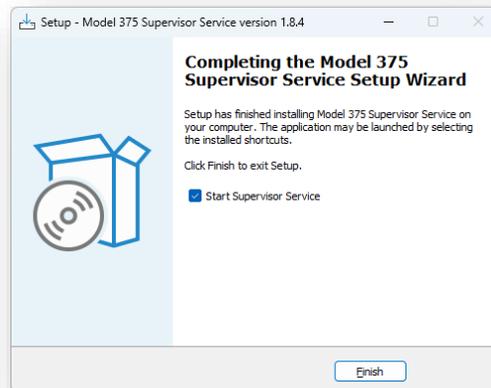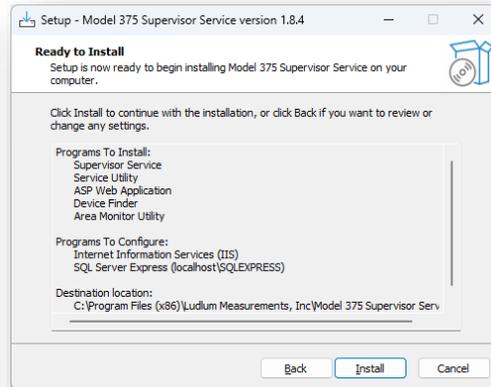
To automatically start the Supervisor service, check this box. This only works if the installer was run as an administrator.

NOTE: For the Save to CSV feature to work, the security permissions for the installation folder need to have the following user added with write permissions:

　　　　 IIS_IUSRS

If this is an upgrade to a version prior to 1.7.3, run the UpgradeAreaMonitorTable.sql file by opening SSMS and selecting File/Open/File…. Navigate to:

C:\Program Files (x86)\Ludlum Measurements, Inc\Model 375 Supervisor Service\sql\UpdateAreaMonitorTable.sql.

Click Execute to run the upgrade script.

Configuring Internet Information Services Manually (optional)

If you are configuring Internet Information Services manually, proceed to the appropriate instructions for your computer's operating system.

1. Open Internet Information Services (IIS) Manager.

2. Expand Sites in the left pane of the IIS Manager window.

3. Right-click on "Default Web Site" and click on "Add Application."

4. In the "Alias" text box, enter in "AreaMonitor" (without the quotation marks).

5. Click the "Select" button to the right of the "Application pool" text box.

6. Click on the "Application pool" drop-down box and select ".NET v4.5 Classic," then click "OK." **NOTE:** The .NET version may be higher than stated here.

7. Click on the button next to the "Physical path" text box and browse to the directory where the Model 375 Supervisor Service is installed. By default, the installation directory is "C:\Program Files (x86)\Ludlum Measurements, Inc\Model 375 Supervisor Service."

8. Click OK.

9. Expand the Default Web Site in the left pane and select the newly created AreaMonitor.

10. Double-click on Default Document.

11. Click on "Add" in the right pane of the IIS Manager window to add a new default document.

12. Enter in "CurrentStatus.aspx" (without the quotation marks) and click OK.

Testing the Installation

Before any area monitors are configured and connected to the Supervisor service, test to make sure that everything is working correctly.

After the installation has completed, open the web application either by double-clicking on the icon created on the desktop or typing in the following URL:

From another computer open http://ComputerName/AreaMonitor in a web browser.

From the computer running the web application open http://localhost/AreaMonitor in a web browser.

The following page should be displayed after a few moments.
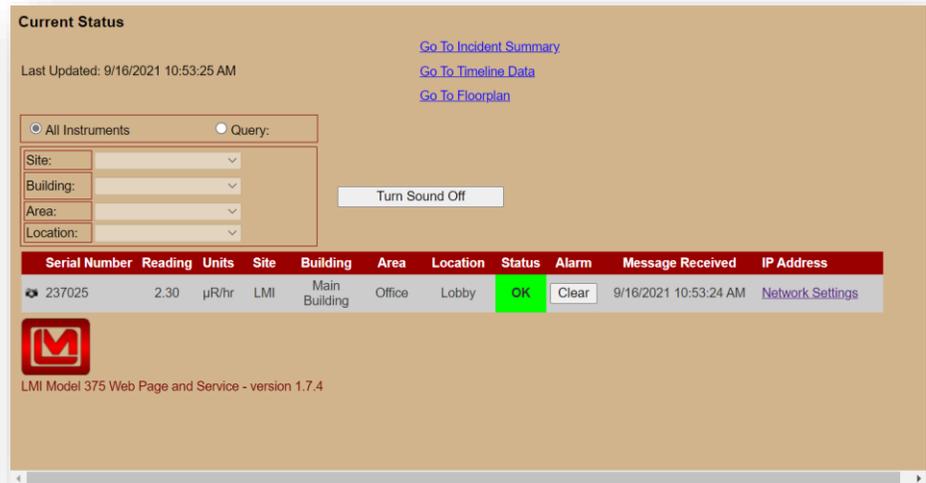
Section

4

Configuration of Area Monitors and Cameras

The Service Utility is used to configure the various features of the software. It provides the following:

- ☢ Add and delete instruments

- ☢ Add camera information for each area monitor

- ☢ Configure email settings

- ☢ Configure database login

- ☢ Setup user-defined fields

- ☢ Place area monitors on a user-supplied location map

Supervisor Settings

Serial Number: This is the serial number of the particular area monitor and must match the value on the instruments network settings page or the value set by the Model 375 Setup Utility.

Camera Enabled: Enable/Disable the camera for this area monitor.

Camera IP or Host Name: Specify the IP Address or host name of the Ethernet camera the for this area monitor.

Camera Image URL: Specify the URL that when combined with the Camera IP will return a static image. Consult your Ethernet camera documentation or manufacturer for the correct value to place here. Some examples are below:

Manufacturer	URL
IQinVision	/now.jpg?snap=pre
Axis	/jpg/image.jpg
Pelco	/snap.jpg

Site: User-defined field to help filter the list of instruments.

Building: User-defined field to help filter the list of instruments.

Area: User-defined field to help filter the list of instruments.

Location: User-defined field to help filter the list of instruments.

Normal Log Interval: Specify the logging interval when the area monitor is not alarming. Typically 5 minutes or 300 seconds is a good choice here since it is usually not necessary to log background at a faster rate. The faster the data is logged the larger and quicker the database will grow.

Alarm Log Interval: Specify the logging interval when the area monitor is alarming. This value can be much quicker than the normal log interval to collect more data during an alarm. The minimum is two seconds.

Log Cumulative Dose: Indicates that the service should keep track of a cumulative dose and the start time of the accumulation of the dose.

Cumulative Dose Reset: Specifies how often the Cumulative Dose is automatically reset.

Save to CSV: Log data to a comma delimited file.

Save to Database: Log data to the SQL database.

Channel Enabled: Service will ignore area monitors that are not enabled. **NOTE:** if you wish for this unit to log data, make sure this option is checked!

Average Readings: When checked, the logged reading will be the average during the log interval. If unchecked, the logged reading will be the maximum reading during the log interval.

Caption: User-defined caption displayed next to the area monitor on screen.

Comment: User-defined comment.

Adding Area Monitors to the Service

The Current Model 375 Unit List at the top of the screen shows all Model 375 area monitors that are added. To add another area monitor to the Supervisor service, click "Add New Model 375 Unit," enter the appropriate settings, and click the **Save Settings** button. This will add the Model 375 area monitor to the Service.

NOTE: If an error occurs saving the settings, this is caused by the user not having admin privileges. Exit the Service Utility and right click on the icon and select Run as administrator.

Modifying and Deleting Area Monitors

To modify the settings of any existing area monitors, simply click on the combo box at the top of the screen and select the area monitor you wish to change. Enter in the desired changes, and then click the "Save Settings" button.

To remove an area monitor from the Supervisor service, use the combo box at the top of the screen to select the area monitor you wish to remove, and then click "Delete Unit From Config File."

Creating a Backup of the Configuration File

To create a backup copy of the configuration file, click "Back Up Config File.
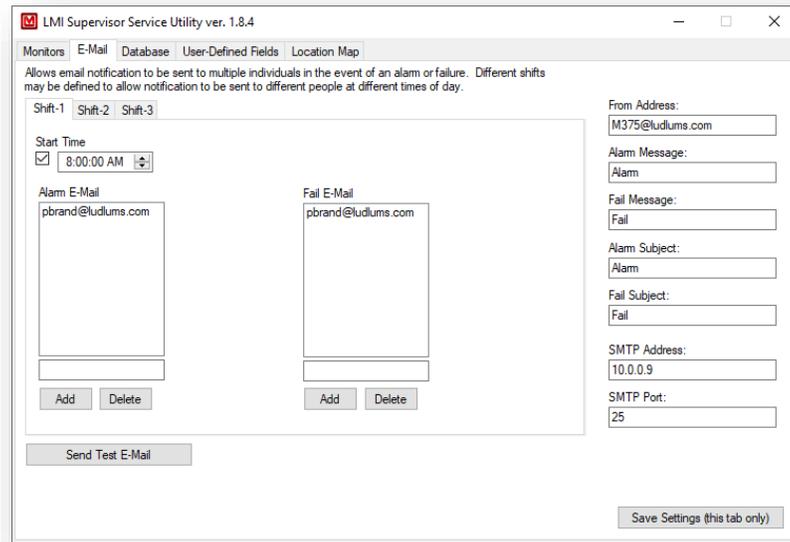
Email Settings

Alarm Notification: For each shift there are 10 email addresses that can be defined to receive alarm notifications.

Failure Notification: For each shift, there are 10 email addresses that can be defined to receive failure notifications.

Shift 1 Start Time: Defines the start time of shift 1.

Shift 2 Start Time: Defines the start time of shift 2.

Shift 3 Start Time: Defines the start time of shift 3.

From Address: Address all emails appear to be from.

Alarm Message: User-defined message added to all alarm emails.

Fail Message: User-defined message added to all fail emails.

SMTP Address: Address of email server. If you do not know this, contact your network administrator for more information.

SMTP Port: Port number of email server. If you do not know this, contact your network administrator for more information.

Alarm Subject: User-defined subject line for alarm emails.

Fail Subject: User-defined subject line for fail emails.

Database Settings

Provider: Database provider. Do not change.

Server Name: SQL Server name and instance. For SQL Express, it should be "localhost\SQLEXPRESS".

User Name: Name to log into SQL database. Must match the user name created when configuring the SQL Server.

Password: Password to log into SQL database. Must match the password created when configuring SQL Server.

Listening Port: TCP port number Supervisor service listens on for area monitors. This must match the value entered when configuring the network settings of the area monitor.

Camera Storage Directory: File path to hold the camera images taken during an event. This must be the "camera" folder where the web application is installed. The default is C:\Program Files (x86)\Ludlum Measurements, Inc\Model 375 Supervisor Service\camera.

Delete Data older than: This allows the user to have the service automatically delete data older than the give time.
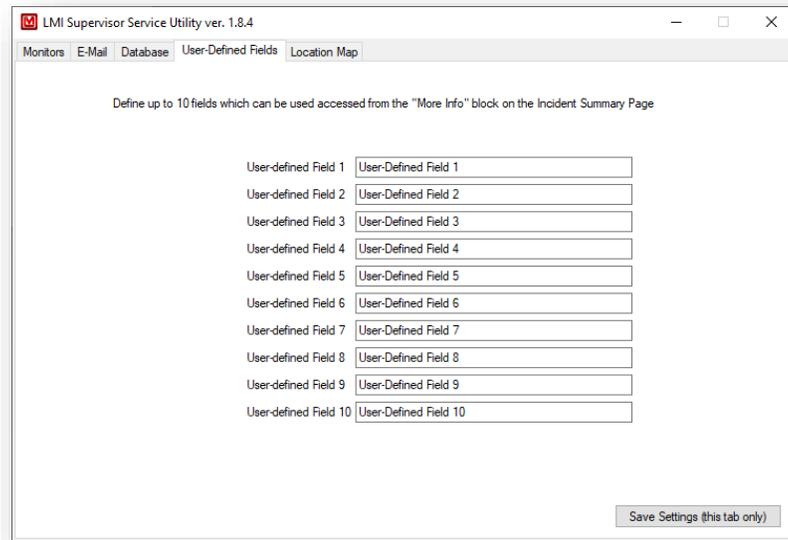
User-Defined Fields

Ten user-defined fields can be set up. For any incident a comment can be added to each field by clicking on the View button next to the incident. These fields can be used to add additional information about the incident. Here each field can be given a name.
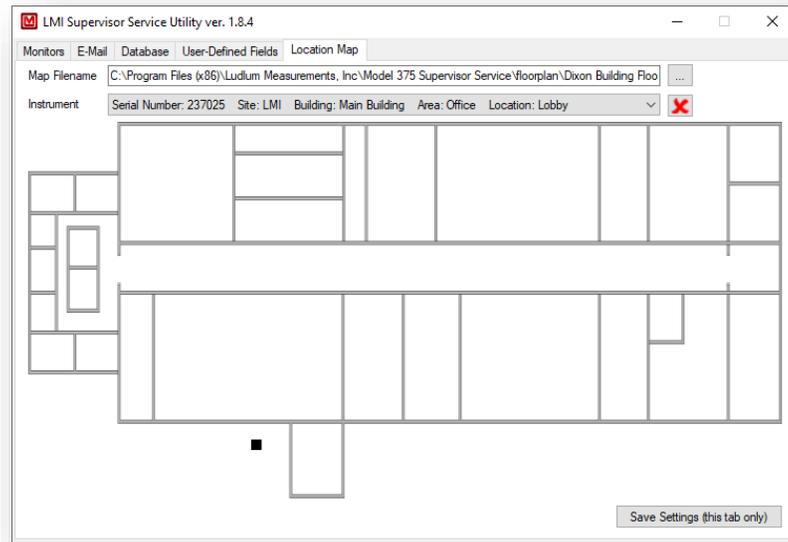
Location Map

The Location map allows the area monitors to be placed on an image of the buildings floor plan. This allows the current status of all instruments to be viewed in addition to its location in the building. The floor plan web page will show the current status of the instrument as a color-coded background along with the current reading.

Select an image to be used for the floor plan. The software supports .BMP, .JPG, and .PNG files. The image will be scaled to fit the screen.

To add an instrument, select it from the drop-down list. Click on the location for the area monitor, and a marker will be placed. This marker represents where it will show up on the floor plan web page. If the instrument needs to be moved, simply click on the new location.

To delete an instrument from the location map, select it from the drop-down list and click the red "X" button. The marker will be removed from the location map and will not show up on the floor plan web page.

Section 5

Operation

The Model 375 Supervisor Service will listen for TCP connections on the specified port. When a connection is made, the service will start processing messages from the area monitor.

NOTE: If any enabled Model 375 area monitors are missing, a "missing" status will be generated for each unit.

If a monitor is missing, no emails will be sent for subsequent alarms and no data will be logged until it connects back to the Supervisor service. The monitors themselves do not have logging capability and rely on the Supervisor service to log data.

Email

When an alarm or failure occurs, the service will send out an email using the address list specified by the shift definition. The area monitor must be in a non-alarming state for 60 seconds before another alarm or fail will be triggered.

NOTE: Email is not sent for a low alarm.

Example email message

```
Subject: [Model 375 Alarm] Area monitor has Alarmed

Reading:  1000 µR/hr
Attention!  Alarm!

S/N: 400000
Hospital 1
Building 2
Floor 3
Room 4

This E-Mail was generated by:
Model 375 Supervisor Service
```

The subject line is user-definable and a custom message can be added to the email.

Data Logging

The data is logged on two different intervals depending on the status of the area monitor. The normal log interval is used when the area monitor is not alarming or failing. The alarm log interval is used when the area monitor is alarming or failing. Typically the alarm log interval is set to log data at a faster rate to collect more information during an alarm. The data can be logged to the SQL Server database and/or a comma delimited (.CSV) text file. The CSV file is saved in the same folder where the service is installed. The file name of this file is the current date in the format of "yyyymmdd.csv." A header at the top of the file identifies the field names.

Example CSV file (20070526.CSV)

```
"Serial Number", "Site", "Building", "Area", "Location", "Reading", "Units", "TimeStamp", "Audio",
"Alarm1", "Alarm2", "OverRange", "Monitor", "ErrorCode", "Ethernet Version", "Monitor Version", "Service
Version", "ImagePath"
"400000","","","","",104.29,"µR/hr","5/26/2007 12:15:45 PM", 0, 0, 0, 0, 1, 0, "Unknown",
"Unknown","1.0",""
```

The area monitors output readings at two-second intervals. The logged data can either be an average of the two-second readings or the maximum value during the interval.

Web Interface

The Ludlum Webpage interface allows users anywhere on the network with appropriate network access to view current status, a list of "incidents" (radiation alarms or instrument failures), or to view a particular instrument's readings in graph form. The user need only use a standard web browser to access the webpage. To access the webpage, the user needs to know the IP address or name of the host computer, or to be furnished a URL link to any of the three pages. Once into the webpage, there are links to move among the three pages.

http://localhost/AreaMonitor
http://computer_name/AreaMonitor

Current Status Page

The Current Status page allows the user to view the current information for all or a selected group of instruments, including the serial number, last reading, location information, and current status for each unit.

The page dynamically updates itself every 10 seconds, which means that the user never has to refresh the page in order to get the most recent information. The color-coded status column on the right indicates one of four possible states – OK, Alert, Alarm, and Missing. If an instrument is either alarming or missing, an audible tone will sound. This tone can be customized by replacing the "alarm.wav" file, located at C:/Program Files (x86)/Ludlum Measurements, Inc/Model 375 Supervisor Service /wav (or wherever the ASP application is installed on the host machine). **NOTE:** If you choose to change the audible tone, the new tone must be named exactly the same as the old tone (alarm.wav).

The Reset Cumulative Dose button will reset the Cumulative Dose and the start time.

The clear alarm button will remotely clear the alarm on the monitor. This is the same as pressing the Alarm button on the instrument. For this option to be shown, the Ethernet firmware needs to be 3905N01 and the instrument needs to be modified by adding a wire between PB-ALARMPT and PF1. When clicking this button the LCD display will briefly show the alarm set point.

Message received shows the last time a message was received from the monitor.

Clicking the network settings button will open the network settings page for the monitor and determine the IP address of the monitor.

By default, all instruments are displayed. To narrow down the list, select the "Query" option and use the drop-down boxes to navigate to different sites, buildings, areas, and locations, and the list will automatically update to show only the selected items:
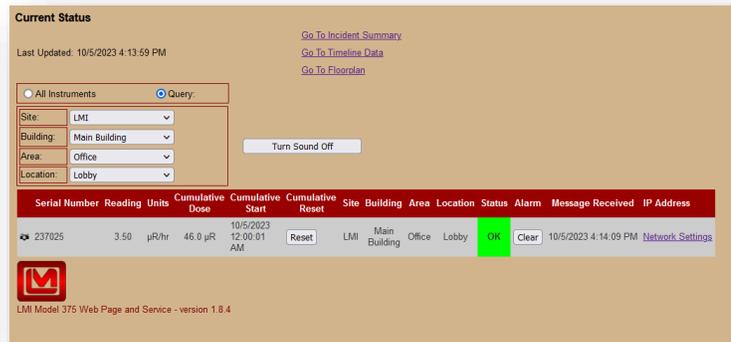
Timeline Data Page

The Timeline Data page allows the user to graph and save historical data from any instrument over any period of time. Graphing features include the ability to click on a point and zoom in and out around the selected point, as well as a graph smoothing feature.

When the page is initially loaded, the data for the first instrument over the current day is loaded, and a graph of the data is generated.
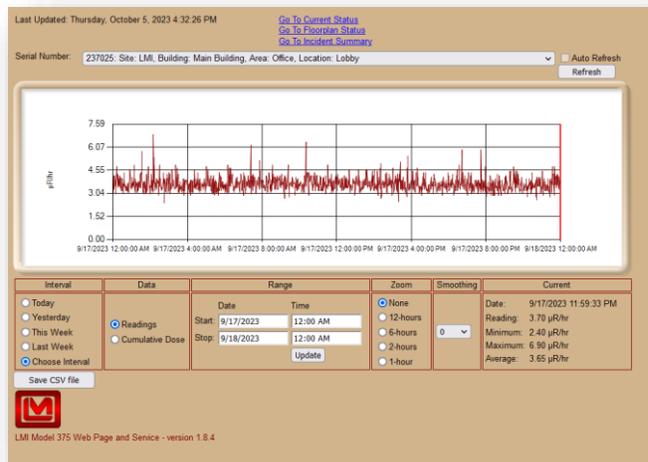

The graph is automatically updated every 10 seconds when the Auto Refresh checkbox is checked and the Interval is set for Today. To select a different unit, use the serial number drop box at the top of the page. To select a different time interval, use the radio buttons located below the serial number drop box.

The user can also select to display either the Readings or the Cumulative Dose.

The user also has the option to save the graph data to a CSV file. **NOTE:** If you use Internet Explorer and wish to save data to a file, you will need to perform the following steps:

1. Go to the Tools menu, then Internet Options.

2. Click on the Security tab, then click on "Local Intranet."

3. Click on the "Sites" button.

4. Click on the "Advanced" button.

5. Click the "Add" button to add the IP address of the server to the list of allowed sites.

If you want a smoother graph, increase the smoothing factor (any integer between 1 and 30). The higher the number, the more smoothing is applied to the graph.
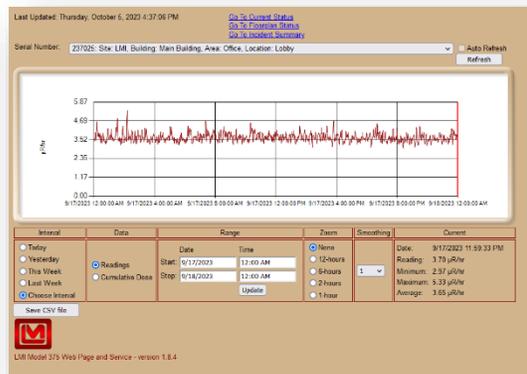
Timeline Graph with smoothing value of 1
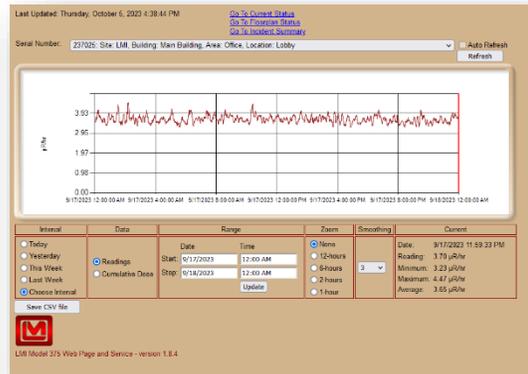
Timeline Graph with smoothing value of 3

Zooming In and Out on Graph

The Timeline Data page allows the user to zoom in and out on the graph. To begin zooming, click on any point on the graph. When you click on the graph, the data for the nearest point will be displayed and within a few seconds, a cursor will appear and highlight where you clicked.
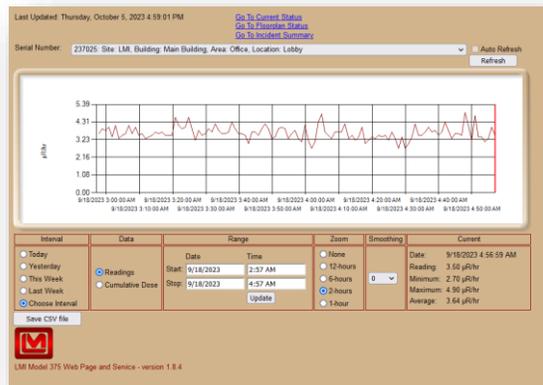
Use the buttons on the bottom to navigate the cursor along the graph's data points. Now you're ready to zoom! There are four zoom levels available, in the following ranges: 12-hour, 6-hour, 2-hour, and 1-hour. Click on the appropriate button for the range you wish to see, or click on "No Zoom" to reset the graph to its original state.
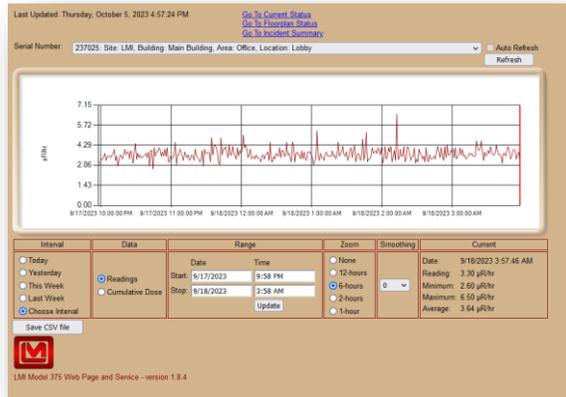
Timeline Graph showing six hours of data
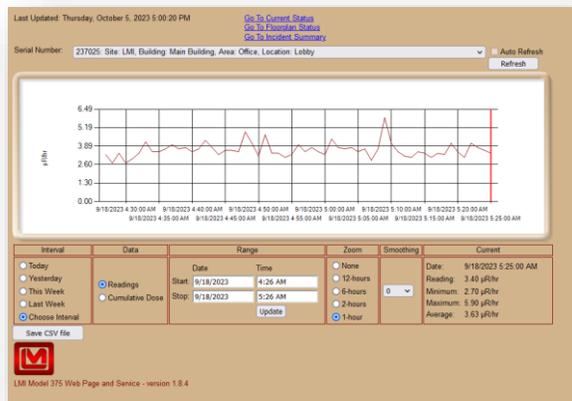
Timeline Graph showing one hour of data

Incident Summary Page

The Incident Summary page keeps track of any incidents that take place on any or all instruments that are connected to the Supervisor service. Incident data can be saved to both an Excel file (.XLS) and a comma-delimited file (.CSV). There are three types of incidents that can occur with the Model 375:

- **ALARM** – The alarm incident occurs when the reading from an instrument exceeds the second (highest) alarm level.

- **FAIL** – The fail incident occurs when the instrument is connected to the Supervisor service but is not working properly.

⬤ **MISSING** – The missing incident occurs when the Supervisor service cannot connect to an instrument.

When an incident takes place, the Incident Summary page logs the start of that incident. To avoid multiple listings of an incident that is intermittent but persisting, the instrument must remain incident-free for 60 seconds before the summary page declares the incident over. After the incident has been clear for 60 seconds, the service logs the time/date of the end of the incident.

The View button next to each incident allows the user to enter in information or comments about the event.

The user can select a time period to view incident data in the same manner as the Timeline Data page. The user can also narrow down the incident list to a particular site, building, area, and location in the same manner as the Current Status page.

The Incident Summary page updates itself every 10 seconds unless the "Choose Interval" option is selected (the auto-refresh can be disabled by clicking on the "Incident Refresh: On" button, similar to the Timeline Data page). This enables a "live" look at any incidents that take place, allowing the user to stay on top of a potentially dangerous situation.

If a camera logo appears next to an alarm incident, this means that an image was taken at the time of the incident and is available for viewing. Click on the camera image to open a separate window and view the image. If the red exclamation

point appears next to an alarm incident, this means that the camera for that unit was enabled but is either malfunctioning or missing.

Clicking the View button next to an incident will open a page where comments can be entered. Ten comment fields can be used to add additional information about the incident. Click the Save button to save the comments. The View button will change to green once comments have been saved for an incident.

Floor Plan Status Page

The Floor Plan page allows the user to view the current information for all or a selected group of instruments, including the serial number, last reading, location information, and current status for each unit on a location map.
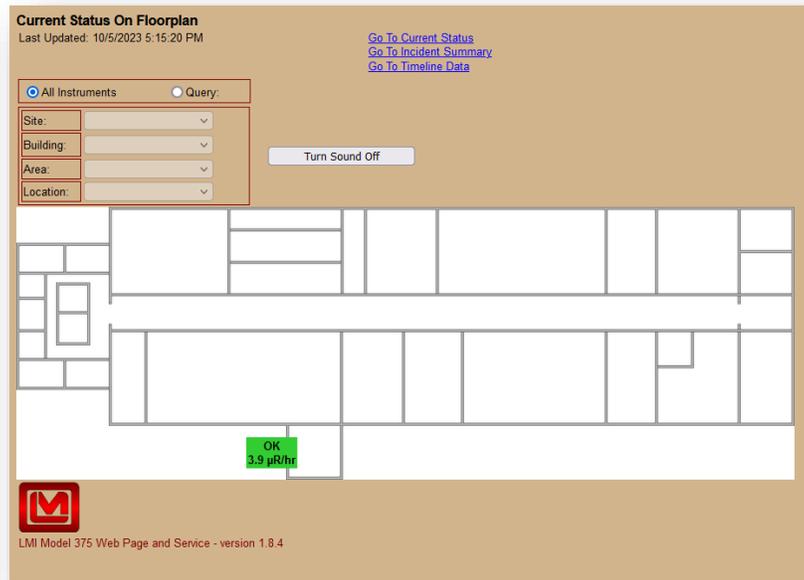
The page dynamically updates itself every 10 seconds, which means that the user never has to refresh the page in order to get the most recent information. The color-coded status indicates one of four possible states – OK, Alert, Alarm, and Missing. If an instrument is either alarming or missing, an audible tone will sound. This tone can be customized by replacing the "alarm.wav" file, located at C:/Program Files (x86)/Ludlum Measurements, Inc/Model 375 Supervisor Service /wav (or wherever the ASP application is installed on the host machine).

NOTE: If you choose to change the audible tone, the new tone must be named exactly the same as the old tone (alarm.wav).

By default, all instruments are displayed. To narrow down the list, select the "Query" option and use the drop-down boxes to navigate to different sites, buildings, areas, and locations, and the list will automatically update to show only the selected items.

Revision History

Version 1.8.7

- Added Cumulative Dose Units to the to the Timeline's CSV.

- Fixed bug where the Timeline's Save to CSV button would always claim there was no data to print.

- Fixed bug where the Incident History would show an error when trying to read data.

- Fixed bug where, if the Floorplan page was left open for long enough, an error would show claiming it ran out of Connection Pools.

Version 1.8.6

- Added Cumulative Dose Units to the CSV Database.

- Changed the Timeline Data chart to show the Cumulative Dose Unit when the Cumulative Dose is selected.

Version 1.8.5

- Fixed bug where a device's Floor Plan's X Location would be loaded, and subsequently saved, incorrectly.

Version 1.8.4

- Added Cumulative Dose.

- Added ability to installer to have a custom database name.

- Added ability to automatically purge old data.

- Fixed bug that corrupted the settings for the 375s when deleting a 375.

Version 1.8.3

- Internal Release only.

Version 1.8.2

- Internal Release only.

Version 1.8.1

- Internal Release only.

Version 1.8.0

- Internal Release only.

Version 1.7.6

- Updated Device Finder to find new ESP32 board, which is the replacement for the RCM3750 Ethernet board.

Version 1.7.5

- Fixed memory leak running supervisor server over time.

- Fixed area monitor utility to see 39805N01 firmware.

Version 1.7.4

- Added support to reset the alarm remotely. Ethernet board must have firmware 39805N01 and the instrument must be modified with wire between PB-ALARMPT and PF1 (Pin 5) of the Ethernet socket.

- Added command_list table to store commands to be sent to monitor.

- Added current._status table to store status of monitors rather than querying the area_monitor table.

Version 1.7.3

- Increased SQL command timeout in incident history page to prevent timeouts from occurring when database has millions of records.

- Updated table to include more indexes.

- Fixed issue with Device Finder crashing when searching for monitors.

- Updated Area Monitor Utility to make it clearer which versions of firmware use the utility and which ones use the built-in network settings page on the monitor.

- Updated Area Monitor Utility network settings report.

Version 1.7.2

- Increased camera http get timeout from 5 seconds to 10.

- Fixed so acquiring camera image doesn't depend on if email is enabled.

- Renamed installation packages. The 2008-2016 installer should work with anything in between.

Version 1.7.1

- Added command timeouts to 240 seconds.

Version 1.7.0
- Fixed   index   out   of   range   error   in AreaMonitorXmlProtocol.HandleClient.

Version 1.6.9
- Merged in BWH pager branch.

- Added a setting that enables or disables the paging code   in supervisor.exe.config and serviceutility.exe.config.

Version 1.6.8
- Fixed connection pooling issues when leaving the web page up in a web browser for a long time.

Version. 1.6.7
- Fixed issues displaying floorplan.

- Updated query on current status and floor plan pages to be compatible with SQL Server 2005.

- Updated code for incident page to show the camera image correctly. There was an issue in creating the URL to the image.

- Changed current status page to open to camera page without using the static image URL so a live view can be seen.

- Fixed how ChartImageHandler was storing data.

Version 1.6.6
- Added floor plan.

- Changed to have service pull camera image.

Section
6

Ethernet Information

IP Addresses

NOTE: Never connect a device into your network unless you are sure the IP Address and network mask are configured correctly. Failure to do so may disrupt your network.

Each device on a network has a unique address. This number is called the Internet Protocol (IP) Address. This number can either be dynamically or statically assigned. A static IP Address is assigned to the device manually. A dynamic IP Address is automatically assigned by a Dynamic Host Configuration Protocol (DHCP) server. The format is a 32-bit numeric address written as four numbers separated by periods (dots). Each of the four numbers ranges from 0 to 255.

Ethernet Cable Termination
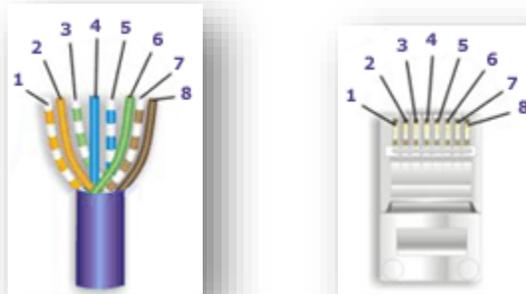
Looking at the connector with the pins at the top facing you, pin 1 is on the left. Pin 8 is on the right.

Pin 1 – White/Orange

Pin 2 – Orange

Pin 3 – White/Green

Pin 4 – Blue

Pin 5 – White/Blue

Pin 6 – Green

Pin 7 – White/Brown

Pin 8 – Brown

Tools required for cable termination

- Wire Strippers

- Network Cable Tester

- Network Cable Crimper

- RJ-45 connectors appropriate for cable conductor type

- Category 5E Network Cable, Stranded or Solid conductor

Stranded cable is generally used where the network cable can be moved, such as patch cables. Solid cable is used where the cable will be fixed, such as internal wiring in walls.

If possible, save some of the extra cable that has been pulled into where the switch is located. This extra cable can be used to make patch cables, if necessary.

1. Strip off approximately 1 inch of the cable jacket.

2. Untwist the four pairs and straighten them out.

3. Arrange them in a fan shape, following the color order above, with the White/Orange wire on the left and the Brown wire on the right.

4. Bring the wires together until they touch. Double-check the order.

5. Cut the wires to make a 90-degree angle approximately ½ inch from the end of the jacket. The wires must be cut straight so that they fit all the way into the connector to make good contact with the pins.

6. Align Pin 1 of the cable with Pin 1 of the connector and insert the cable into the connector. Push firmly so the wires go all the way to the top of the connector and the jacket goes into the connector by about 3/16 inch. Again, check to make sure the colors are in the right order.

7. Place the connector into the crimp tool and squeeze the handle hard.

8. Inspect the connector to make sure all pins were crimped.

9. Repeat Steps 1-8 for the other end.

10. Use a cable tester to test the cable for shorts and crossed wires.

Section

7

Troubleshooting

The most common issues when setting up the hardware and software are:

- ☢ Area monitors reported as "Missing"

- ☢ Unable to set the network settings of the area monitor

- ☢ Errors when accessing the web pages

The first two issues are almost always a network issue, while the last issue is usually a problem with the server configuration. For troubleshooting purposes, start with the area monitor and work back to the server.

Troubleshooting the Area Monitor

Some basic things to ensure are that the area monitor is turned on, it is connected to AC power, and a network cable is connected to it. The network jack the area monitor is plugged into must support 10 MBs/half-duplex. Verify that the switch shows a link for the area monitor.

Ethernet Output

When the area monitor establishes a connection, a data message will be sent every two seconds in the form of an XML document. Below is an example XML message:

```
<?xml version="1.0" encoding="us-ascii" ?>
<area_monitor rev ="1.0" serial="12345">
  <status>
    <rate>9999.9</rate>
    <units_code>99</units_code>
    <audio>1</audio>
    <alarm1>1</alarm1>
    <alarm2>1</alarm2>
    <over_range>1</over_range>
    <monitor>1</monitor>
    <error_code>9</error_code>
  </status>
</area_monitor>
```

Firewalls

Check to make sure that any firewall or router between the computer running the Supervisor service and the area monitor are not blocking the TCP port used. Firewalls and/or routers may need to be configured to allow the area monitor traffic to pass through.

The Model 375 Setup Utility and Device Finder programs use UDP Port 20034 to communicate with the area monitors.

The area monitor attempts to establish a TCP connection to the Supervisor Primary and Secondary Addresses using the port specified. The firewall should be configured to allow inbound and outbound traffic on UDP port 20034 and inbound TCP on whichever port number was specified in the Model 375 Ethernet settings. This should match the port that the Model 375 Supervisor service is listening on.

Ethernet Status Lights

If the cover is removed from the area monitor to expose the Ethernet board, there are two status LEDs that can be used to help troubleshoot connectivity problems. These LEDs are located near the Ethernet connector.

The yellow LED is the activity indicator and the green LED is the link indicator. When powering on the area monitor, the green LED will blink once. This will indicate that the Ethernet board is getting power. With an Ethernet cable connected, the green LED will be steady ON, which indicates a link to the network. The yellow LED should blink to indicate network activity. Depending on network activity, the light may blink occasionally or may blink very fast.

Troubleshooting the Network

Troubleshooting network problems can be tough to track down, especially if the network is complex and if the area monitors are located in different locations. Below are some steps to try if you cannot communicate with an area monitor or if it cannot communicate with the server.

Unable to Configure Network Settings

The Ethernet settings can be configured in one of two ways, depending on the firmware version. Firmware versions 39801n11 and earlier use UDP communication and require the use of the Model 375 Setup Utility. Firmware versions 39801n12 and higher can be configured by accessing the area monitor by its IP address in a web browser. The Model 375 Setup Utility can still be used to see the area monitor and its network settings, but it will not be able to change them.

If the area monitor cannot be seen in the Model 375 Setup Utility and has firmware 39801n11 or older, try one or more of the following:

1. Move the area monitor to the same network (location) as the server and connect it to the network there.

2. Connect a laptop loaded with the Model 375 Setup Utility directly to the area monitor using a cross-over cable if necessary. The network settings on the laptop do not matter, but the network card needs to be configured for 10 MBs/half-duplex.

3. Disable or modify the firewall settings to allow traffic on UDP port 20034. If you are not sure how to add a rule to the firewall, temporarily disable the firewall. If you still cannot see the area monitor in the Model 375 Setup Utility, re-enable the firewall as this is not the cause.

4. Cycle the power on the area monitor.

5. Try pinging the area monitor if you know its IP Address. See instructions below. If possible, try from the server and from a computer on the same network as the area monitor.

If the area monitor cannot be seen in the Model 375 Setup Utility or by a web browser and has firmware 39801n12 or newer, try one or more of the following:

1. Disconnect all area monitors that are not working except for one. If the area monitors have the default settings, then they will all be set to the same IP address, which will make it difficult to access them.

2. Try pinging the area monitor. See instructions below. If possible, try from the server and from a computer on the same network as the area monitor.

3. If you can see it with the setup utility but not in a web browser, contact your IT department as they may need to change your computer's security settings to see the web page running on the area monitor.

4. Cycle power on the area monitor.

Ping the Area Monitor
It should be possible to ping the area monitors by IP Address from the computer running the service as shown below:

```
C:>ping 192.168.10.66

Pinging 192.168.10.66 with 32 bytes of data:

Reply from 192.168.10.66: bytes=32 time<1ms TTL=128
Reply from 192.168.10.66: bytes=32 time<1ms TTL=128
Reply from 192.168.10.66: bytes=32 time<1ms TTL=128
```

```
Reply from 192.168.10.66: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.10.66:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

There should be no lost packets, and the time for each packet should be less than 100 ms. If there are any lost packets or error messages, then the area monitor is not properly configured on the network, or there is a problem with the network.

### Area Monitors Report as Missing

If an area monitor is reported as missing, this means that it is not able to make a TCP connection to the computer running the Supervisor service. The area monitor will attempt to make a connection first to the Primary Supervisor address and then to the Secondary Supervisor address on the TCP port specified. This port must match the port in the Model 375 Supervisor Server Utility under the Database tab. The default port number is 50000.

Try one or more of the following to determine what the problem is:

1. Plug a laptop with the same network settings as the area monitor into its network jack and see if you can ping the server's IP address. If you can ping the server OK, try using telnet to access the server. This can be done from the Windows command line using the command "telnet ip-address port-number" (without the quotes). Substitute the IP address of the server and port number with the correct values. If you cannot ping or telnet into the server, this indicates a problem with the network or server configuration.

2. Stop the Model 375 Supervisor Service on the server and run HyperTerminal if available. In HyperTerminal, configure the host address to that of the area monitor, the port number to the port used, and connect using TCP/IP (Winsock). Select Wait for Call from the Call menu and wait for the area monitor to make a connection. If the connection is successful, the screen will fill with the XML data message. If no data is displayed or a connection is not established, verify that the area monitor is correctly configured to connect to the server.

Troubleshooting the Supervisor Service

First make sure the Model 375 Supervisor Service is running. Launch the Services Manager by selecting "Run…" from the Start Menu. Type in "services.msc" (without quotes) and press enter. The Services console should display.
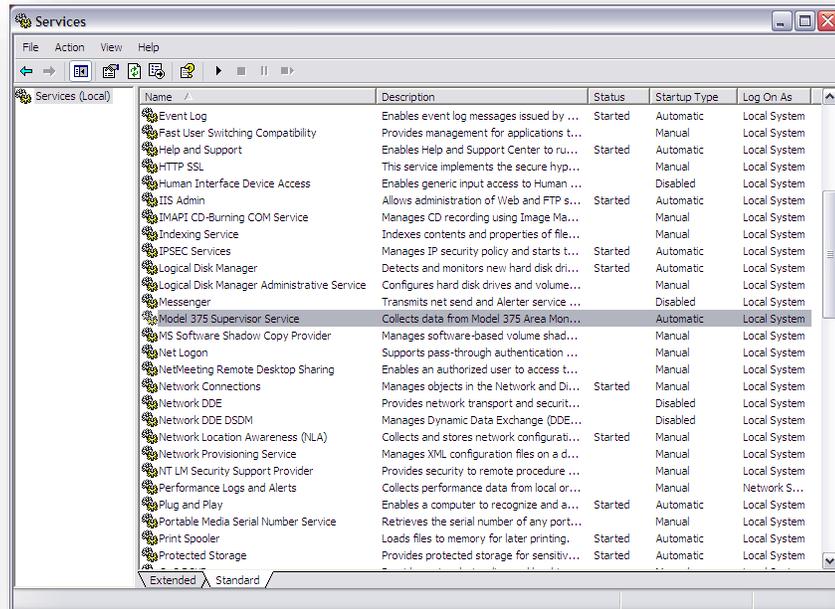
Check that the Model 375 Supervisor Service status is "Started" and that the Startup Type is set to "Automatic."

If the service is not started, click on the Start Service button in the toolbar. If the Startup type is not "Automatic," the service will not start automatically when the computer is started. Right-click on the Model 375 Supervisor Service and select Properties.
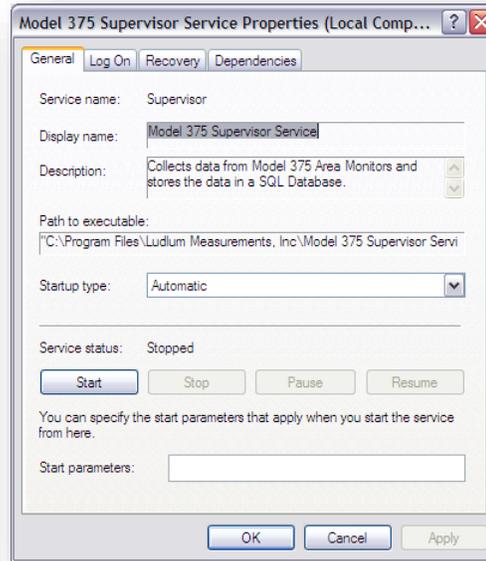
Make sure the properties for the service match the settings in the screenshot above.

NOTE: It can take up to one minute before any data is saved in the database after the service has been started.

Troubleshooting the Web Page Application

The following is a list of errors that are commonly encountered with the Web Page Application:

Error 404 or 404.2

This can indicate that the ISAPI and CGI Restrictions are set to deny ASP.NET v4.0.30319. First, open the IIS Manager. The IIS Manager is located in the Control Panel, under "Administrative Tools." Double-click on ISAPI and CGI Restrictions and change the ASP.NET v4.0.30319 to "Allowed." Do this for both the 32- and 64-bit versions.

Web page does not load

First, open the IIS Manager. The IIS Manager is located in the Control Panel, under "Administrative Tools."

Click on the plus icon next to your computer name, and then click on the plus icon next to the "Web Sites" folder. Click on "Default Web Site" and see if it is running. If it is stopped, click the Play button under the Menu bar to start the website.

If the website is running and you still get this error, check to see if the "AreaMonitor" virtual directory is included in the Default Web Site. If it is not, refer to the "Configuring Internet Information Services" section for instructions on how to add the AreaMonitor virtual directory.

Directory Listing Denied

First, open the IIS Manager. The IIS Manager is located in the Control Panel, under "Administrative Tools."

Click on the plus icon next to your computer name. Click on the plus icon next to the "Web Sites" folder. Click on the plus icon next to "Default Web Site." Right-click the "AreaMonitor" virtual directory, and then click on "Properties."

Click the "Default Documents" tab. The first default document listed should be "CurrentStatus.aspx." If CurrentStatus.aspx is not in the list, add it and move it to the top of the list.

If you have any further questions on how to add a default document to a virtual directory, refer to the "Configuring Internet Information Services" section.

Invalid object name "area_monitor"

If you get this error, then the "area_monitor" table does not exist in the SQL Server database.

If you have not started the Model 375 Supervisor Service, refer to the "Troubleshooting the Supervisor service" section on page 47 for details on how to start the service.

It takes the Supervisor service approximately 60 seconds to create the "area_monitor" table in the database once the service is started. Wait at least 60 seconds, and then try to reload the web page again. If the web page still does not appear, the service may need to be restarted. Refer to page 47 for details on how to restart the Supervisor service.

Login failed for user

The most common reason for this error is that the user name and/or password that is set in the Model 375 Supervisor Server Utility does not match the user name and password that is set in Microsoft SQL Server.

Go to the Start Menu and open SQL Server Management Studio under the "Microsoft SQL Server" program group.

Click on the plus icon next to the "Databases" folder. Make sure that the "lmi_area_monitor" database is present.

Click on the plus icon next to the "Security" folder, and click on the plus icon next to the "Logins" folder. There should be a login present other than the "sa" and the built-in logins.

Double-click on the "ludlum" login. **NOTE:** The login name may be different if you manually configured the SQL Server.

Open the Service Utility. Click on the "Database Settings" tab and verify that the user name and password matches the user name and password from the login properties window in SQL Server Management Studio. When the user name and password is set correctly, click "Save Settings" in the Supervisor Server Utility.

NOTE: You may need to restart the Supervisor service at this time.

Default Web Site Won't Start – Unexpected Error 0x8ffe2740 occurred
If you get this error, another program on your computer is using TCP port 80, which is the port that IIS uses to host the web page.

Could not load file or assembly 'App_Licenses' or one of its dependencies
Go to the Control Panel, and then click on "Add/Remove Programs." Click on "Microsoft .NET Framework 4.0." Click on the "Change/Remove" button. Select the "Repair" option and click "Next." Follow the prompts to repair your Microsoft .NET Framework installation.

If this does not resolve the error, call Ludlum Measurements for further assistance.

Current Status page shows no area monitors
The Model 375 Web Page will only display area monitors that are added to the Supervisor service. To add an area monitor to the Supervisor service, use the Model 375 Supervisor Server Utility.

Current Status page shows area monitor(s) with a status of "Missing"
Verify that the area monitor in question is powered on and connected to the network.

Verify that Windows Firewall is not turned on. If it is desired to use Windows Firewall in conjunction with the Model 375 Supervisor Service, configure Windows Firewall to allow the Model 375 Supervisor Service through the firewall.

If this doesn't fix the problem, use either the web interface (firmware versions N12 and later) or the Model 375 Setup Utility (firmware versions N11 and earlier) to verify that the destination IP address matches that of the computer hosting the Supervisor service. Also make sure that the network settings for the area monitor are correct in accordance with their location on the network.

Replacing Rabbit Ethernet Boards

The following steps will assist the user in replacing the Rabbit Ethernet board on the Model 375 Area Monitor.

The Model 375 Area Monitor will either have the Rabbit Ethernet board mounted to the side of the Area Monitor or inside of the area monitor. Refer to the appropriate instructions for your type of Model 375 Area Monitor.

Following are examples of internal and external Ethernet boards.
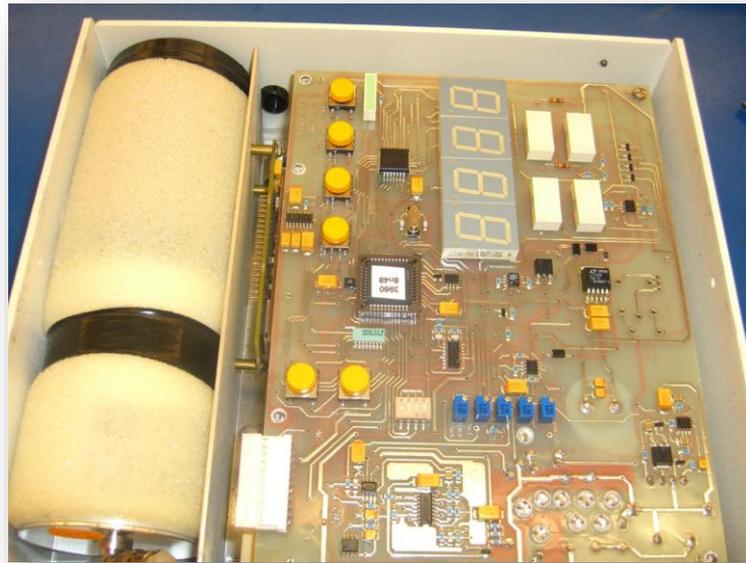
Replacing an External Rabbit Ethernet Board
1. Remove the four screws from the corners of the Ethernet board.

2. Disconnect the 3-pin MTA connector from the Ethernet board to separate it from the area monitor.
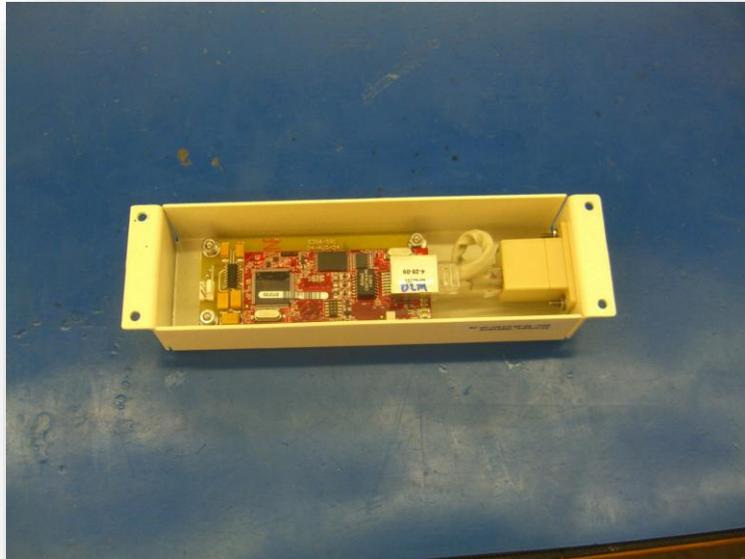

3. Disconnect the CAT-5 cable from the Rabbit board.

4. Remove the four nuts from the corners of the Rabbit board to separate the Rabbit board from its case.

Replacing an Internal Rabbit Ethernet Board

1. Remove the outer case from the area monitor.
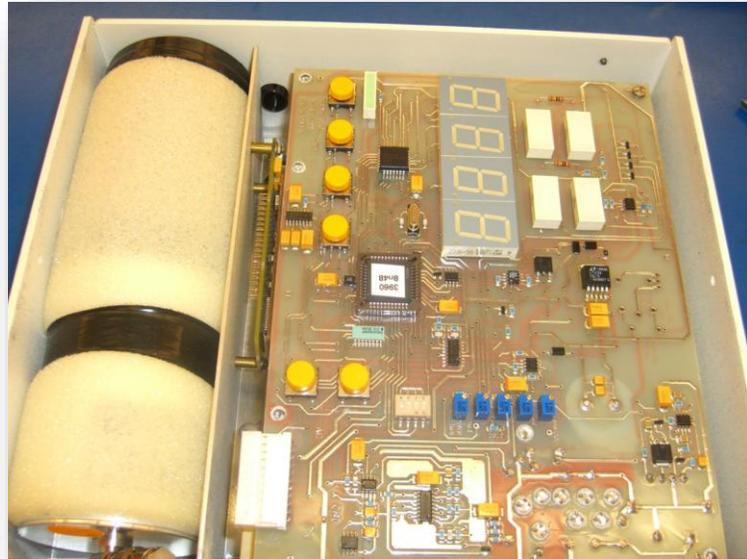
2. Remove the four screws from the corners of the main board and disconnect the MTA connector.

3. Remove the two nuts from the corners of the bracket holding the Ethernet board.
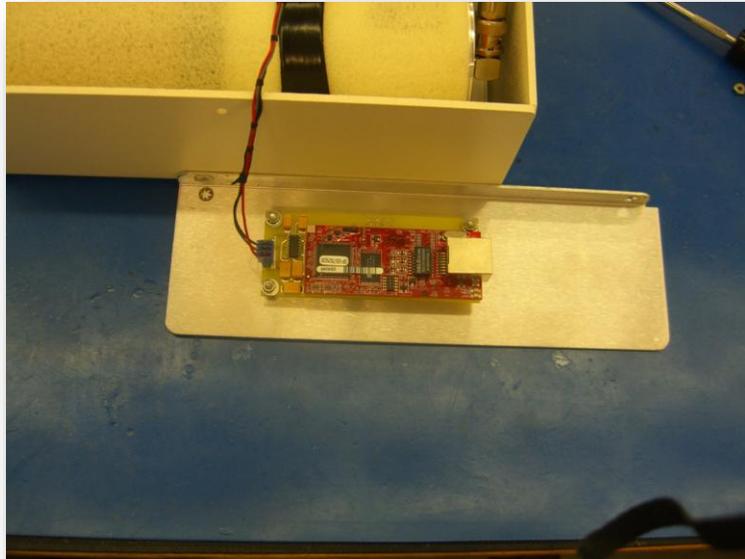
4. Remove the three nuts from the corners of the Ethernet board.