

# 8872 Manual



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## Chapter 1

# 8872

# Theory of Operation

### *8872 Theory of Operation – Hardware*

The Model 8872 is a Windows-based data logger, based on Windows Professional. The 8872 includes a number of hardware and software features to ensure that the device matches the field reliability of the 8832, while offering the convenience of a Windows-based platform and integration with Agilaire's AirVision software.

The core of the 8872 is a fanless PC, typically 4 GB of RAM. The device is equipped with a 128 GB solid state flash drive (SSD).

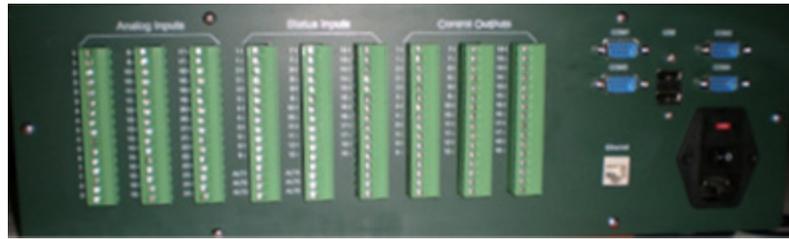


Agilaire's new 8872 Data System Controller (Data Logger)

For all digital versions of the 8872, the remainder of the enclosure simply provides convenient USB, serial, and HOMI I/O connections in a standard 3U rack mount enclosure, a form factor similar to the 8816 / 8832 family. However, the 8872 also supports traditional analog / discrete I/O via a variety of internal I/O modules and a protection / connector board to provide familiar detachable terminal block connections to the back. The layout of the connections is designed to make the unit easy to use as a 'drop in' replacement for an 8816 or 8832.

Up to six (6) I/O modules can be mounted internally, each consisting of either 8 voltage inputs, or a 6 status input / 6 relay output combination.

The rear panel PCB provides surge and overvoltage protection devices for up to 24 voltage inputs, 18 status inputs, and 18 relay outputs.



Back view of Agilaire 8872

Status inputs can also be used for rainfall inputs or frequency/counter inputs (e.g., wind speed).

Additional external I/O can be connected via the rear panel Ethernet connector. External I/O modules are commonly used for specialty input (rainfall counters, RTDs, Thermocouples, etc).



8872 Signal Protection Board-an Agilaire Advantage

The rear panel also includes two (2) USB port connections and four (4) RS-232 port connections (COM1 through COM4). The front panel provides the external I/O network Ethernet connection and two (2) USB connectors. The device supports standard HOMI monitors, USB keyboard/mouse, and most standard PC peripherals and drivers.

It is important to note that the rear panel Ethernet connector and the internal I/O modules run on a different network range (10.0.0.X) than the front panel Ethernet connector (whose IP address can be set by the user). For convenience, it is possible to request that Agilaire route the primary (user) Ethernet connection to the rear panel instead of the front panel. In this case, the front panel connector is disabled.

### Hard Drive Emergency Partition

All Model 8872's are supplied with an emergency partition on the hard drive that can be used as a "return to factory" condition by rebooting and pressing F7 on a connected keyboard during the boot process. The restoration process, however, generally takes 1-2 hours, as it has to restore the entire hard drive image. This is normally only used in severe cases (e.g., OS file problems or virus corruption). Most normal concerns can be resolved by restoring the original database backup, stored in the C:\ root directory.

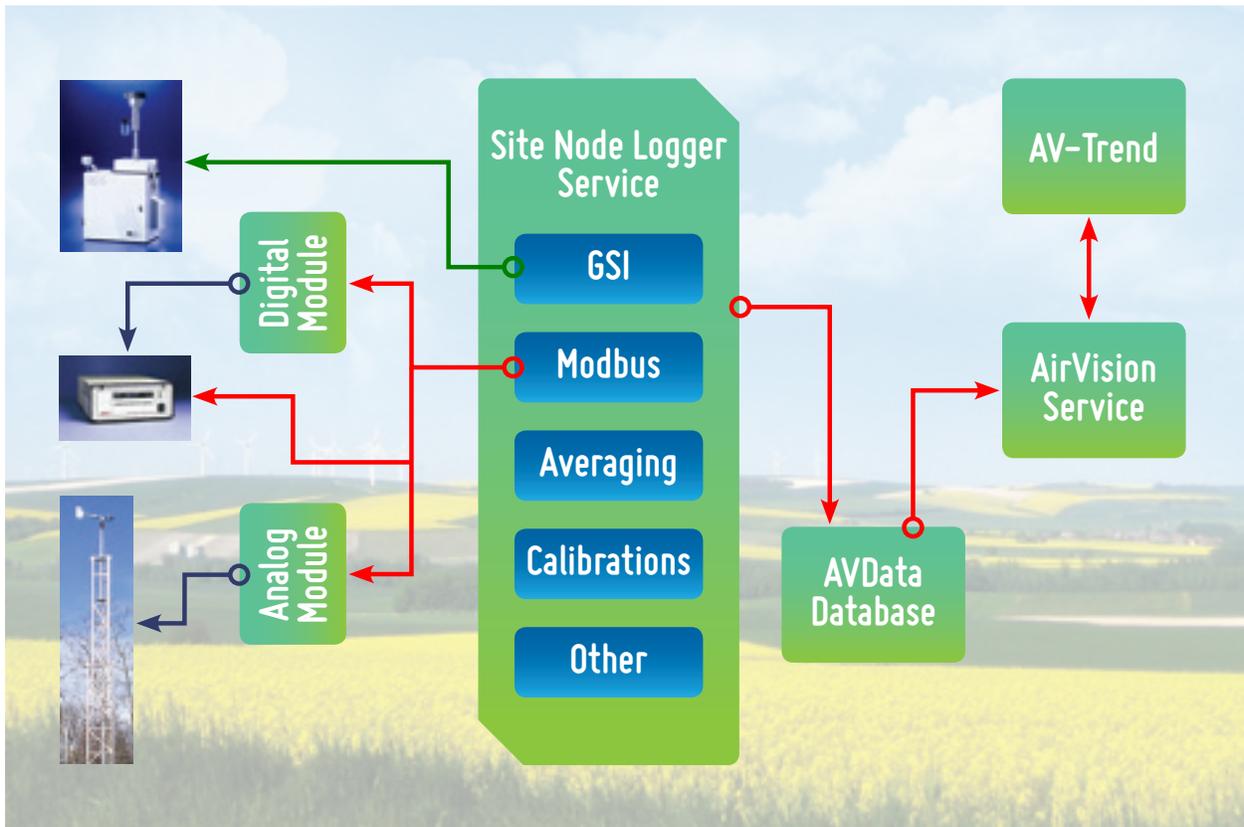
## Theory of Operation - Software

While the AV-Trend software provides the interface for all configuration, reporting, data annotation, logbook, etc, it does not perform the realtime functions normally associated with the data logger, such as:

- ◆ Instantaneous scans of I/O, Modbus, GSI connections
- ◆ Short-term averaging and validation / flagging
- ◆ Calibration Control
- ◆ Short-term alarm generation with relay output control

To fulfill these requirements, the AirVision Service runs a plug-in called the Site Node Logger. The addition of this plug-in distinguishes an 8872 from an AV-Trend PC. This service scans the configuration within the 8872 (channels, calibrations, etc) and loads processes and threads to perform the realtime functions, inserting averaged data, calibrations results, etc, into the 8872 database at the required time.

The Site Node Logger operates at a general scan rate of 3 seconds (for internal I/O modules and external Modbus/GSI devices). Consult Agilaire for applications where higher scan rates are required.

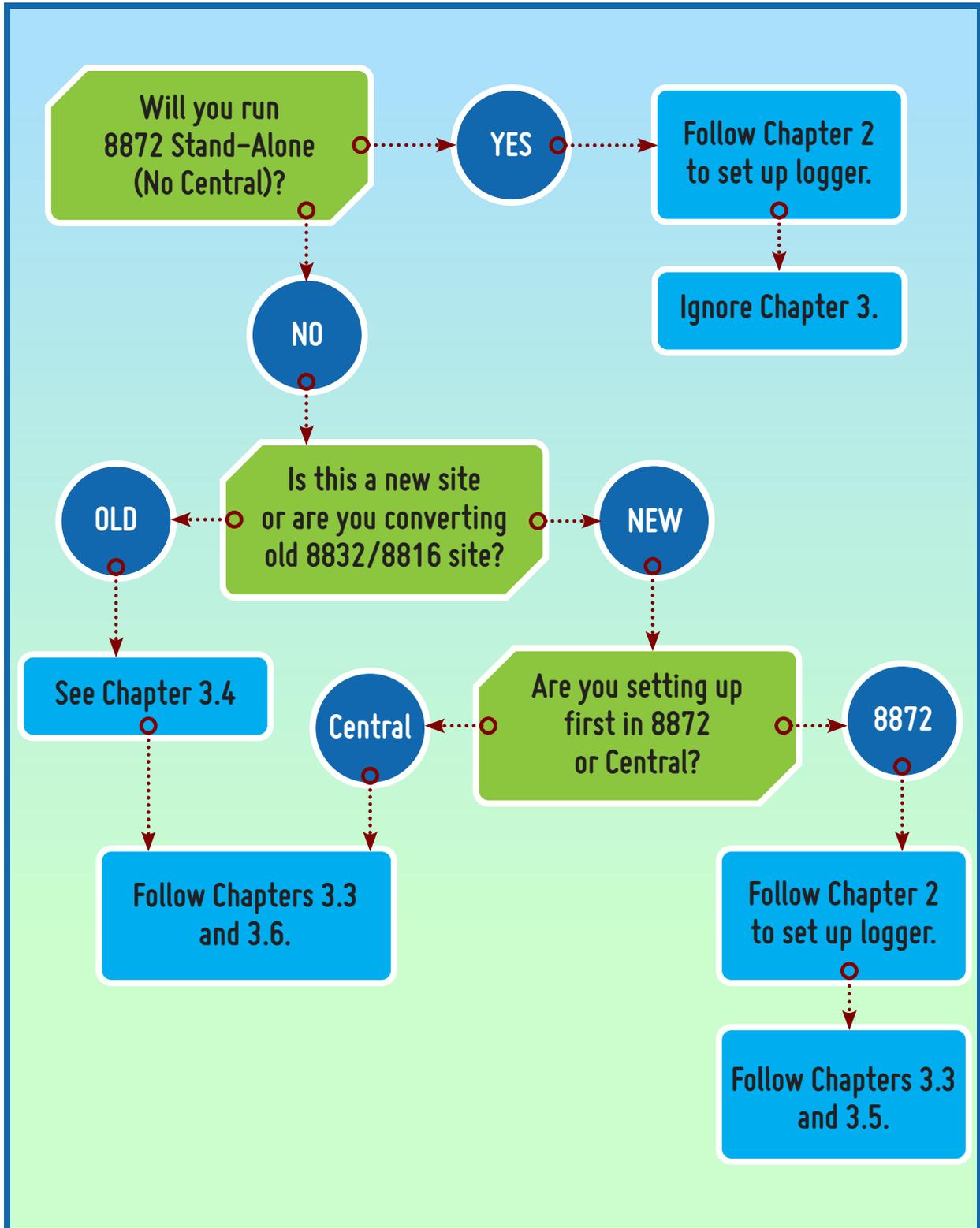


### Special Notes Regarding GSI / Modbus Channel Types (8872 vs. 8832)

Several improvements have been made regarding the handling of GSI and Modbus channels in the 8872, compared to its Model 8832 predecessor:

- ◆ Dongles are no longer required for Thermo analyzers and EcoTech analyzers
- ◆ GSI-based met channels no longer use the two-channel setup (GSI channel, then type V/W/7/8 channels)
- ◆ Sigma-Theta channels now use the “Input Channel” to point to the WDR channel, rather than having a duplicate analog input setup.
- ◆ Analog inputs default to 10V scaling. Changing the volts full scale for accuracy purposes requires the input to be changed manually through the input module’s setup software (see page 44 - Standard (Analog) Channels).

Initial Logger Configuration



## Initial Logger Configuration

By default, the 8872's configuration is pre-loaded with standard analog input channels and digital inputs/outputs to match the supplied I/O configuration. No Parameter records are entered, so the user can create new parameters to match the desired configuration (unused channels are ignored). The user may also need to use the **Change Channel Type** function in the **Channels Editor** to change channel types from the **Standard** calculation to other calculations (**Vector Wind**, **Sigma Theta**, etc).

This configuration can be done in the AirVision central as well, but an initial synchronization of the logger channels should be done before embarking on this.

- ⇒ **Important:** It is critical that the user should not create channels in the AirVision central that conflict with the channels already loaded in the 8872 before synchronizing. These channel configurations include internal ID codes that will not reconcile in this case.

The screenshot shows the 'Sync Contract Editor' window with a table of sync contracts. The table has the following columns: Contract Name, Sync Direction, Sync Scope, Remote Sync Connection, Reading Look Back Days Limit, Most Recent Contract Modification, and Contract Needs Provisioning. Two contracts are listed: '178:102128 Configuration Contra' and '178:102128 Data Contract', both with a 'Download' sync direction and 'Logical Configuration Scope' and 'Data Scope' respectively.

Contract Name	Sync Direction	Sync Scope	Remote Sync Connection	Reading Look Back Days Limit	Most Recent Contract Modification	Contract Needs Provisioning
178:102128 Configuration Contra	Download	Logical Configuration Scope	178:102128 Connection	-	01/01/2012 1654	✓
178:102128 Data Contract	Download	Data Scope	178:102128 Connection	-	01/01/2012 1653	✓

After the first configuration sync, you may elect to change this to either of the following:

- ◆ Download, Then Upload = apply changes in logger to central, then apply changes in central to logger
- ◆ Upload, Then Download = apply changes in Central to logger first, then apply changes in logger to central.

## Special Notes Regarding Required SQL Configuration for 8872

- ◆ **TCP/IP Protocol** must be enabled using **SQL Configuration Tool**.
- ◆ SQL Server must be configured to allow **Remote Connections**.
- ◆ The “sa” account must be enabled (under **Security**) and the correct password must be set in the connection string.
- ◆ **Firewall** should allow **ports 1433 open** on the 8872, router, and intervening firewalls.

Normally, Agilaire sets all these defaults in the 8872, but the settings are repeated here in the event local IT staff changes the settings, or for users who want to use site node logger software with their own PC hardware.

*Reference***Default Internal Network Settings:**

<i>Internal I/O Module</i>	<i>TCP Address</i>
Voltage Input 1-8	10.0.0.101
Voltage input 9-16	10.0.0.102
Voltage Input 17-24	10.0.0.103
Digital Input/Output 1-6	10.0.0.201
Digital Input/Output 7-12	10.0.0.202
Digital input/Output 13-18	10.0.0.203

**Site Node Logger Service Error Log Location:**

C:\Users\All Users\Agilaire\AirVision\Server\SiteNodeLogger

## Troubleshooting

<b>Symptom</b>	<b>Check</b>
No new data coming into database, no data is visible on realtime display	<ol style="list-style-type: none"> <li>1. Check <b>Windows Service Manager (Start &gt; Run &gt; services.msc)</b> to verify that <b>Site Node Logger</b> and <b>Watchdog</b> services are running.</li> <li>2. If not, try to manually start service.</li> <li>3. If service fails to start, locate <b>Logs</b> and email to Agilaire.</li> <li>4. Also check <b>ConfigError</b> file in <b>Log Directory</b> for messages</li> </ol>
New data comes in, but all values are marked "0<".	<ol style="list-style-type: none"> <li>1. Verify that secondary network <b>IP address</b> is set to <b>10.0.0.5, with Gateway 10.0.0.1</b>.</li> <li>2. Use <b>Start &gt; Run &gt; cmd</b> to open DOS window and try to <b>ping</b> each of the internal I/O modules at the IP addresses given above.</li> <li>3. If ping fails for <b>one module</b>, check <b>internal Ethernet wiring</b> for faults.</li> <li>4. If ping fails for <b>all modules</b>, check <b>internal Ethernet switch</b> for power indication and connection lights.</li> <li>5. If service fails, locate <b>Logs</b> and email to Agilaire.</li> <li>6. Also check <b>ConfigError</b> file in <b>Log Directory</b> for messages</li> </ol>
New data comes in, some values are marked "<", but values are coming in and some averages are not flagged.	Check <b>Modbus</b> device scan rates in the 8872, <b>Configuration &gt;Channels &gt;Modbus Instruments</b> . Scan rates should be set to "30" unless otherwise directed by Agilaire.

## Chapter 2

# Configuring the 8872

The 8872 provides nearly unlimited flexibility in setting up systems and configuring servers. This chapter explains how to set up the following parts of the 8872:

2.1 Configuring System Preferences

2.2 Site and Parameter Setup

Channel Configuration

2.3 Channel Type Specifics

Adding/Modifying Channels - Basic Settings

Channel Specific Settings

Validation and Flags

2.4 Adding an Instrument

2.5 Setting up Calibrations

2.6 Configuring Digital Events

2.7 Average Alarms

2.8 Data Rollup Processor

2.9 Scheduling Tasks

2.10 Favorites Editor

2.11 GSI Drive Editor

2.12 Configuring Security

## 2.1 Configuring System Preferences

To set up system preferences, open **Parameter Settings** from **Configuration Editors** and double-click the **System** icon. The System is the agency or area, such as Knox County or State of Tennessee. Typically, each agency setup will only have one System (a second system could be used to help separate, for example, air toxics or water quality data from the other quality data), but it is possible to set up more than one by clicking the **Add System** button on the ribbon.

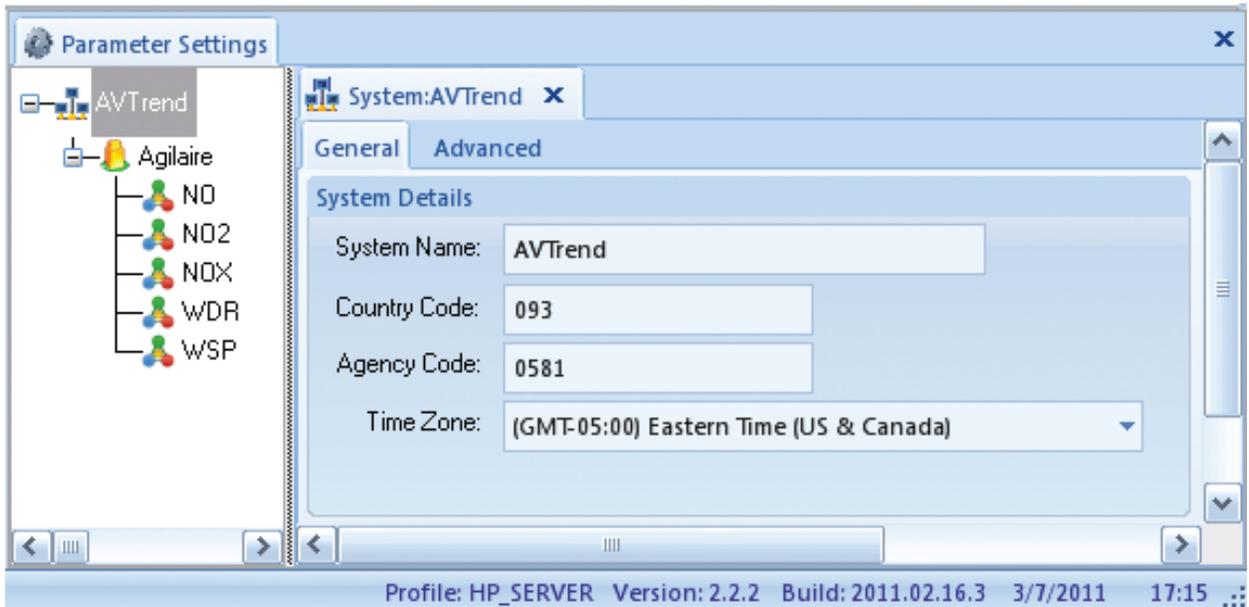
Verify that the **Time Zone** is correct. The other fields (listed below) are optional, and typically used only if your license includes full Ambient reporting:

### System Name

**County Code** (not normally used by the 8872)

**Agency Code** (not normally used by the 8872)

Click the **Save** button.



System Configuration from Parameter Settings Editor

## 2.2 Site and Parameter Setup

The **Parameter Settings Editor** from the **Configuration Editors** menu allows administrators to add, edit, and delete sites and parameters. For the Model 8872, you should only have a single Site represented.

### Adding a Site

To add a site (if it is not already automatically added or to modify the default site settings), single-click **Configuration Editors/Parameter Settings**. In the **Parameter Settings** screen, highlight your **System** in the tree diagram and click the **Add Site button**. Required fields are **Name** and **Time Zone**. Enter the name of your **Site** and select a **Time Zone** from the drop-down list. Select the **Enabled** box and click the **Save** icon.

To edit a site, double-click the **Site** name in the Parameter Settings tree diagram, make changes, and click the **Save** icon.

The screenshot shows the 'Site/Parameter' configuration window in AirVision. The 'Editor Options' bar at the top includes buttons for 'Add System', 'Delete System', 'Add Site', 'Delete Site', 'Modify Site', 'Add Parameter', 'Delete Parameter', 'Modify Parameter', and 'Close Active Form'. The main configuration area is titled 'Site Solway' and contains the following sections:

- General:** Name: Solway, Description: main site, Abbreviation: SW, Time Zone: (GMT 05:00) Eastern Time (US & Canada), Enabled:
- Miscellaneous:** Latitude (e.g., 45.04500), Longitude (e.g., -75.4000), Surrogate Slope, File Input Code, EPA County or Tribal Code: 47 - TN, 093 - Knox
- Address:** Street Address 1, Street Address 2, City, County, State Region, Zip Code
- Additional Information:** A table with columns 'Name' and 'Value'.

Site Configuration from Parameter Settings in Configuration Editors

Site Metatags	
Name	Value
SiteIdentifier	0004
CSI_TestIntervals	1h
CSI_0010	1h

The Site Editor contains the following fields for information about the site:

- ◆ Name (Required)      Alphanumeric characters to refer to the site, e.g., NKnox
- ◆ Description      Brief description of the site, e.g., North Knoxville (optional)
- ◆ Abbreviation      This field is used for special formats only. (File Import is not available in the Model 8872.)
- ◆ Time Zone (Required)      Select from drop-down list.
- ◆ Enabled (Required for polling)      Check the box to enable the site. If this box is not selected the site will not be polled or appear in report/editor selections.
- ◆ Latitude      To comply with EPA standards, enter latitude in decimal format. For example, 75 degrees, 15 minutes, and 0 seconds would be entered as 75.250000. Enter up to 2 places and a minus sign if needed to the left of the decimal and up to 6 places to the right of the decimal.

- ◆ Longitude To comply with EPA standards, enter longitude in decimal format. For example, 75 degrees, 15 minutes, and 0 seconds would be entered as 75.250000. Enter up to 2 places and a minus sign if needed to the left of the decimal and up to 6 places to the right of the decimal
- ◆ EPA Site Two-character site code provided by EPA (Full Ambient Reporting only)
- ◆ AIRNow Mnemonic Not used by the 8872
- ◆ Surrogate Slope Not normally used by the 8872
- ◆ Surrogate Offset Not normally used by the 8872
- ◆ File Import Code Not normally used by the 8872
- ◆ EPA County or Tribal Code County or Tribal code provided by EPA (Full Ambient Reporting only)
- ◆ Site Group- (Optional) Allows user to organize sites into user-defined groups (e.g., “Rural”, “Downtown”, “NCore”). Names of parameter groups must first be entered into the **Site Groups Editor** in Configuration->List Editors. Normally, this is an AirVision Server-Side function, and is only shown in the 8872 / Site AV-Trend PCs for display purposes.
- ◆ Web Site Display Name (AirVision only) Allows user to define a name to use to display the site in AgileWeb that is different than the regular AirVision name. If the field is blank (and the site is configured to display in AgileWeb), the regular AirVision site name is used by AgileWeb.
- ◆ Address Physical address of the Site.
- ◆ Additional Information You can add notes at the bottom of the Site Editor by clicking on the asterisk at the bottom of the screen. Enter a **Name**, for example “Distance to tree line,” and a **Value**, for example “70 feet.” When you have completed your entry press the **Enter** key on your computer keyboard. Your entry will be moved to the next row in the Additional Information section.

### Adding Parameters

To add a parameter configuration, highlight a **Site** from the **Parameter Settings** tree diagram and click the **Add Parameter** button near the top of the 8872 screen. To edit a parameter select a **Site** and then double-click a **Parameter**.

Site: 01\_KNOX  
 Parameter: 01\_O3  
 Parent Parameter: [dropdown]  
 Parameter Group: [dropdown]  
 Website Display Name: [text field]

Parameter Template: OZONE\_PPB [dropdown] [Apply]

Enabled:  Enable AIRNow Reporting:   
 Filter From Web Site:

Parameter Data Type:  Average / Continuous  
 Sample / Non-Continuous

Description: 01\_OZONE, channel 1  
 Math Equations (if Calculated): NODIF [dropdown]  
 EPA POC: 1  
 EPA Method: 007  
 EPA Units: 000 - Parts per billion [dropdown]  
 EPA Parameter: 44201 - Ozone [dropdown]  
 Reported Digits: 4 [spinners]  
 Precision: 1 [spinners] Calibration Precision: 2 [spinners]

Truncate Round Rule:  Round  Truncate  
 Reported Units: PPB [dropdown]  
 Analyzer Units (if different): [dropdown]  
 Graph Minimum: 0.00  
 Graph Maximum: 500.0  
 Calibration Span: [text field]  
 Instrument Detection Limit: [text field]  
 Limit Of Quantization: [text field]  
 Minimum Detectable Limit: 2.000  
 Practical Quantization Limit: [text field]  
 Parameter Report Order: [dropdown]  
 Totalize in Reports  Minimum in Reports

Additional Information

Parameter Metatags	
Name	Value
ParmIdentifier	44201

Parameter Configuration from Parameter Settings in Configuration Editors



- ◆ EPA POC                                      Enter an EPA Parameter Occurrence Code if needed. POC is used for different monitors measuring the same parameter at one site. (Full Ambient Reporting only.)
  
- ◆ EPA Method                                   EPA sampling Method Code
  
- ◆ EPA Units                                    Select EPA Units (including the EPA unit code) from the drop-down list (e.g., 007-parts per million, 015-degrees Fahrenheit).
  
- ◆ EPA Parameter                              Select a parameter (including EPA parameter codes) from the drop-down list (e.g., 44201 - Ozone).
  
- ◆ Reported Digits                             Total number of digits, including decimal places, that will be reported to the EPA.
  
- ◆ Precision                                     Number of decimal places for reporting precision. X's and Y's to the right of the reporting precision field illustrate the format of the digits/precision, e.g., XX.YY indicates a total of four Reported Digits with a Reporting Precision of two.
  
- ◆ Cal Report Precision                        Number of decimal places to the right to use for calibration report, calibration error calculations, and AQS reporting of 1-Point Precision Checks.
  
- ◆ Truncate/Round Rule                       Determines whether data in reports will be rounded or truncated
  
- ◆ Reported Units                              Units that will be used for reports e.g., PPM
  
- ◆ Analyzer Units                              If the analyzer units are different from the primary parameter, select analyzer units from the drop-down list.
  
- ◆ Graph Minimum                              Lower y-axis limit for graph display
  
- ◆ Graph Maximum                              Upper y-axis limit to for graph display
  
- ◆ Calibration Span                            This field is determined by the instrument. Enter the configured calibration span value for the parameter to determine the parameter's calibration error (at the data logger).
  
- ◆ Instrument Detection Limit (DL)        Not used in 8872.

- ◆ Limit of Quantization (LOQ) Not used in 8872.
- ◆ Minimum Detectable Limit (MDL) Not used in 8872.
- ◆ Practical Quantization Limit (PQL) Not used in 8872.
- ◆ Parameter Report Order Parameters in reports are printed in the same order that they are shown under each site. Select Parameter Report Order to change the order parameters appear in reports. Report Order only applies to Daily Summary and Monthly Reports.
- ◆ Totalize in Reports If this option is selected, Monthly Reports will show a total of data rather than an average. Totalize in Reports is most commonly used for rainfall.
- ◆ Minimum in Reports If this option is selected, Monthly Reports will show a minimum of data rather than a Maximum. Minimum in Reports is most commonly used for temperature.
- ◆ Additional Information You can add notes at the bottom of the Parameter Editor by clicking on the asterisk at the bottom of the screen. Enter a **Name**, for example “Data Last Certified,” and a **Value**, for example “9/1/2008.” To add another row when you have completed your entry, press the **Tab** key on your computer keyboard. A blank row will be displayed.

## Channel Configuration

“Channels” are the entities that tell a data logger (8832, 8872) how to acquire data in real-time from an instrument to form averages, that are then passed on to *Parameters* in AirVision to store the data. Channels represent the physical side (instruments, wires, RS-232 connections, etc), while Parameters represent the logical side or “slots in the database.” It’s possible to have *Parameters* but not *Channels* if the data comes from some source other than being averaged by the data logger, such as the File Import Tool, or direct instrument polling.

The information for *Channels* is set up in Data Source Details in AirVision (or “Logger Channels” in the 8872 menu).

### Basic Channel Information

In the setup of most of the channel types the Channel tab will have identical fields on the Channel tab as the Standard channel setup has, except where noted in descriptions below in this document.

Do not use spaces in the channel names and avoid using equation symbols in the channel names as these can cause problems with math channels if such channel names are used in a math equation.

When a Channel is first created the Channel Name will be displayed as Chan1, Chan2, etc. If you have already configured a parameter (recommended), when you select the associated Parameter in the top right, the name will automatically propagate over to the Channel Name field once the next field has been selected. However, channel names are limited to 8 characters (as a holdover from 8816s and 8832s), but the Channel Name can be edited.

The Channel Number will automatically be filled in with the next available number, but it can be changed by using the radio buttons to select the logical number of the channel being configured.

Set the Average Intervals for the Base, Extended1, and Extended 2 and their Storage Times. 001M data is usually setup on the Base Average. The data logger will average instantaneous readings over the Base Avg Interval, and then those base intervals are used to build the two extended intervals. To change the interval click the down arrow and select another interval type from the drop down list.

The Extended Average 1 is usually used for auxiliary data, the most common being 005M or 015M data. If the Base Average Interval is 1 minute, then the first extended average may be an auxiliary, hourly, or daily interval type (of which have to be divisible by 60 and a multiplier of the base). To change the interval click the down arrow and select another interval type from the drop down list.

The Extended Average 2 is usually used for hourly data, but can be used for daily data as Average 1 is set to hourly data. Average 2 must use a higher interval type than Average 1, and must be a multiplier of the base average. To change the interval click the down arrow and select another interval type from the drop down list.

Storage Time for all three intervals is the length of time the 8816 or 8832 data logger will store the averages (not used/visible for the 8872). Each interval has its own storage time setting which can be set between 0 to 999. Click the down arrow and select from the from down list the time span of: S = seconds, M = minutes, H = hours, D = days.

## Basic Channel Types

The different channel types distinguish the way that an input is taken, or the way averages are formed from the data. A summary of the various channel types follows:

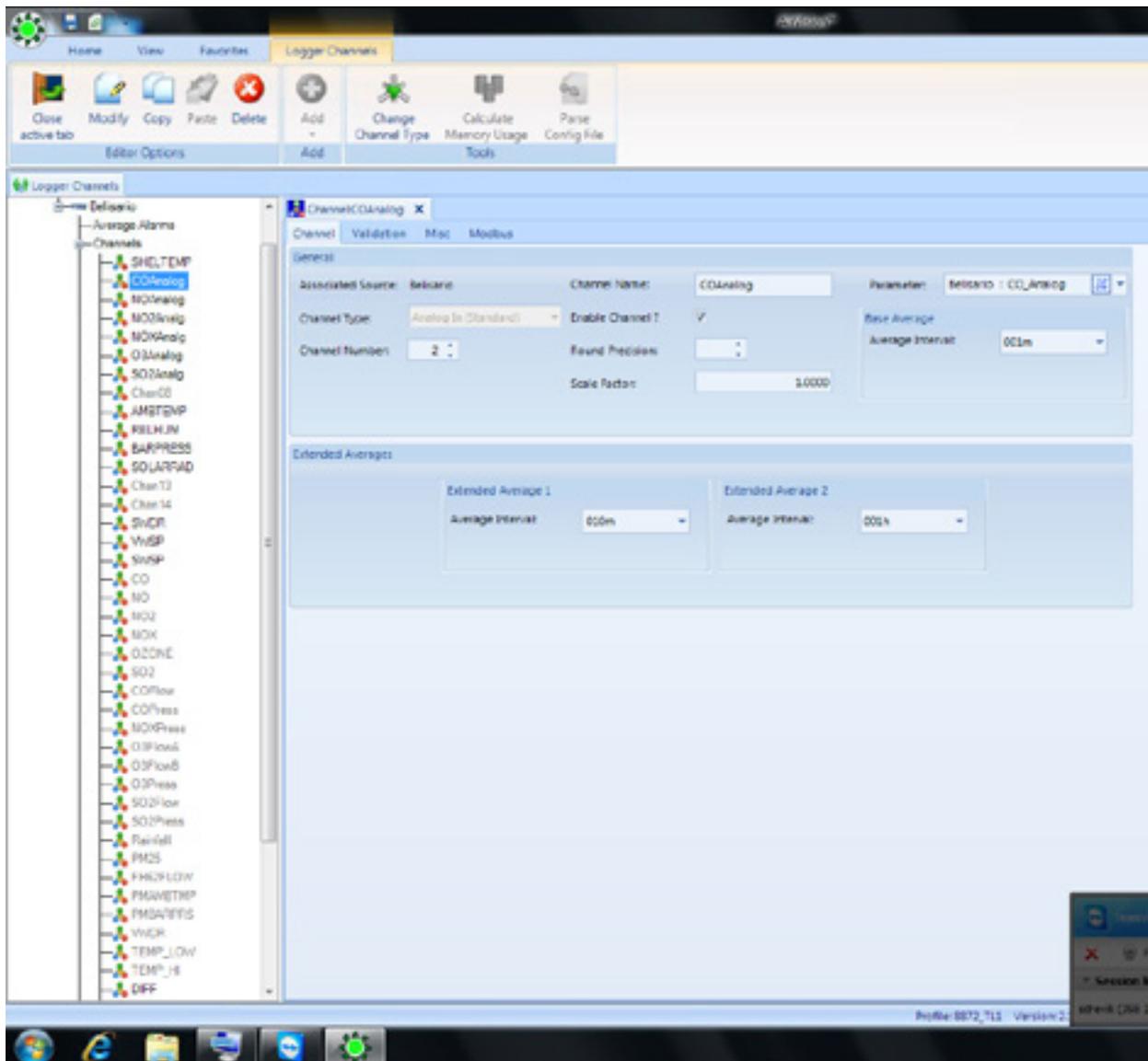
<i>Channel Type</i>	<i>Description</i>
Standard Averaging	Takes the instantaneous values of an analog input on the Model 8872 and forms up to three linear averages.
Modbus	Takes the instantaneous values from a Modbus device (e.g., analyzer) and forms up to three linear averages.
GSI (Serial)	Takes the instantaneous values from a serial device (e.g., analyzer) and forms up to three linear averages.
Scalar Wind Speed	Takes the instantaneous values of an analog input or from another GSI channel and forms up to three linear averages. Provides three resultant averages.
Scalar Wind Direction	Takes the instantaneous values of an analog input or from another GSI channel and forms up to three unitary vector averages, taking into account 360 degree crossover (and resolving directions > 360 degrees for the case of 0-540 instruments). Provides three resultant averages.
Vector Wind Speed	Takes the instantaneous values of an analog input or from another GSI channel and forms up to three vector-based averages, based on a companion vector wind direction channel. Provides three resultant averages.
Vector Wind Direction	Takes the instantaneous values of an analog input or from another GSI channel and forms up to three vector-based averages, based on a companion vector wind speed channel. Provides three resultant averages.
Sigma Theta	Takes input from another wind direction channel (standard or GSI) and performs the Yamartino sigma-theta calculation to determine sigma-theta. Gives two resultant averages, with the second being an RMS calculation from the first.
Linear Sigma	Takes the input from any other channel type and performs a linear sigma (square root of standard deviation) calculation. Useful for sigma-W calculations. Provides three resultant averages.
External Channels	The Model 8872 supports a new channel type "E" for External Channels. These allow the user to create a 'fake' channel associated with parameter from a directly polled instrument (e.g., BAM, E-Sampler, etc), where the logger is not doing real-time acquisition. It exists ONLY to create a channel number for use with logger polling. The External type channel requires no other special configuration, and is ignored by the Site Node Logger process.
Rolling Average	Takes the input from any other channel type and performs a rolling average calculation (e.g., hourly average that rolls on the minute, 8-hour average that rolls on the hour, etc). Only one resultant average.
General Channel	Takes the input from any other channel type and performs determines either the maximum or minimum value of that input during a designated averaging period. If the input interval is set to 1s, the max/min instantaneous reading is recorded, rather than the max/min average. Commonly used for peak wind gust calculations, or max/min daily temperatures.
Rainfall Channel	Takes the input from any Modbus device, calculates the difference before/after any average period, and weights that difference by a designated scaling factor (e.g., 0.01 inches per count). Provides three resultants.

## 2.3 Channel Type Specifics

### Adding/Modifying Channels - Basic Settings

Still in the **Configuration Editor**, **Logger Channels**,

- ◆ select a **Logger** that has already been added to a **Site**
- ◆ click the **Add** button.
- ◆ select **Add Channels**,
- ◆ select a **Channel Type**, e.g., Standard Averaging, GSI, VWS, etc. For details on how these different channel types work and their settings, consult page 26 - Channel Types.
- ◆ select a **Channel Number** (a channel number will automatically be added in order but it can be changed)
- ◆ select a **Parameter**. When you select a parameter, the Channel Name will automatically be changed to match the Parameter name.
- ◆ select an **Average Interval** and **Storage** for the **Base Average**, **Extended Average 1**, and **Extended Average 2**.
- ◆ Click the **Save** button

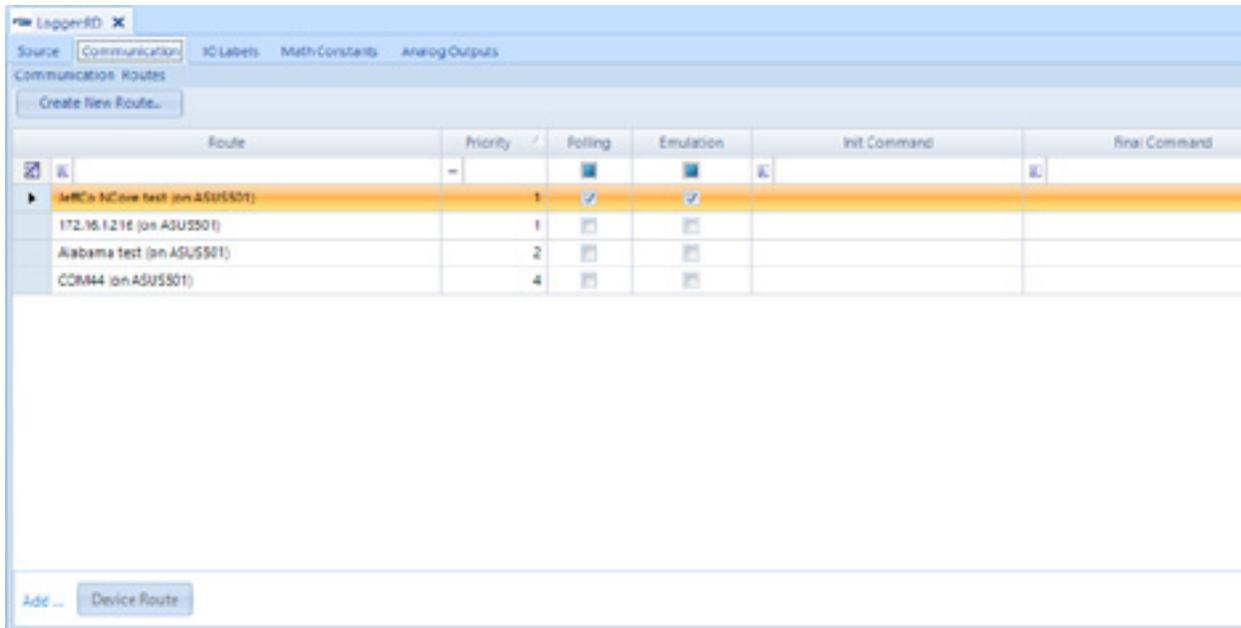


Adding channels to loggers in the Data Source Configuration from Configuration Editors

## Text Strings in Digital I/O

### Logger Properties Tabs

**Communications** - This tab is used in AirVision and AV-Trend to set the method by which the software communicates with an external logger (see “Adding Communication Routes”). It is not used in an 8872 for the base logger properties, and should remain blank.



**IO Labels** - This tab is used in to set the properties of the digital inputs and output lines in the data logger, and how they relate to other elements of the software. Properties include.

- ◆ **Physical Inputs / Physical Outputs:** This is only used in AirVision and AV-Trend in association with ESC 8816/8832/8864 loggers, and can help avoid download errors associated with pseudo inputs and outputs when the number of input and output cards do not match. They can be blank in most cases, and is not used with the Model 8872.
  - ◆ **Name:** 20-character label downloaded to the data logger.
  - ◆ **Description:** Optional, allows for a longer description.
  - ◆ **Name:** 20-character label downloaded to the data logger.
  - ◆ **Modbus Instrument / Coil:** Leave blank for physical inputs/outputs in ESC loggers. Set for internal modules on the 8872 and for any external Modbus-capable instrument or calibrator to map pseudo-inputs and pseudo-outputs to analyzer/calibrator control or status monitoring functions. See tutorial videos under “Training” at Agilaire.com for more details on connecting to commonly used calibrators.
- ▶ **Note:** When mapping pseudo-outputs in ESC loggers to analyzers/calibrators, the corresponding pseudo-input must be unused (and vice-versa for mapped pseudo-inputs).

- ◆ **Alarm Definition / Line State Triggering Alarm:** Used for the Advanced Alarm Feature in AirVision/CEM. See AirVision/CEM manual, Digital Alarm Trigger for details. Not used in regular ambient applications.
- ◆ **Open State Text:** Allows user to define an alternate text for the Site Node Logger Toolbox display of inputs/outputs in the Model 8872 data logger for the open (normal) state condition. Not applicable for ESC loggers.
- ◆ **Open State Text:** Allows user to define an alternate text for the Site Node Logger Toolbox display of inputs/outputs in the Model 8872 data logger for the closed (active) state condition. Not applicable for ESC loggers.

**Math Constants** - This tab is used to set primary values and, optionally, secondary or tertiary values (switched by physical or pseudo digital inputs) of math constants (K01-K32) used by the data loggers in math equations. The math equation will use the primary value, unless the status input pattern matches that set for either the secondary or tertiary value, and a secondary/tertiary value has been set. This feature is used commonly in CEM applications for fuel factor / GCV value switching, but can also be used in ambient applications as holding registers for values updated by channel averages (e.g., holding end of hour BAM values) or values written during the calibration process (e.g., expected values read back from calibrators). See the “write to math constant” functions in the Channel Configuration->Validation and in the Calibration configuration sections.

Number	Name	Primary Value	Secondary Pattern	Secondary Value	Tertiary Pattern	Tertiary Value	Description
1	K01		Select Lines		Select Lines		K01
2	K02		Select Lines		Select Lines		K02
3	K03		Select Lines		Select Lines		K03
4	K04		Select Lines		Select Lines		K04
5	K05		Select Lines		Select Lines		K05
6	K06		Select Lines		Select Lines		K06
7	K07		Select Lines		Select Lines		K07
8	K08		Select Lines		Select Lines		K08
9	K09		Select Lines		Select Lines		K09
10	K10		Select Lines		Select Lines		K10
11	K11		Select Lines		Select Lines		K11
12	K12		Select Lines		Select Lines		K12
13	K13		Select Lines		Select Lines		K13
14	K14		Select Lines		Select Lines		K14
15	K15		Select Lines		Select Lines		K15
16	K16		Select Lines		Select Lines		K16

**Analog Outputs** - This tab is used to set analog output settings for the Model 8816, 8832, 8864, or 8872 loggers. Consult the Analog Outputs section/appendix in the relevant logger manuals for more details on usage.

DAC Channel Number	Channel	Interval	High Input	Low Input	High Output	Low Output	Action On Error
1	ID: [D] 502	001m	2000	0	20	4	Hold

## Channel Specific Settings

The **Analog In (Standard)** channel takes readings from a physical analog input, scales the voltage (or current) to an engineering value, and then performs a simple arithmetic average of all the values. The settings under the Misc. tab define the information required:

- ◆ The Analog Input Number specifies the physical input that the analyzer wires are connected to. The analog input number does not have to be the same as the channel number.
- ◆ For Model 8816 or 8832, The High and Low In Voltage/mA are where the Voltage or Milliamps are entered. Typical values are -10 to +10 V for a voltage card and 4 to 20 mA for a current card. For the Model 8872, the High and Low In are assumed to be the full voltage/current range set on the input module (e.g., 0-5V or 4-20mA) for that input.
- ◆ The High and Low Out Eng Units of the instrument corresponding to the High or Low Input are entered.

The screenshot shows the 'Misc' tab of the configuration interface. Under the 'Analog Input' section, there are five input fields: 'Analog Input Number', 'High In Voltage/mA', 'Low In Voltage/mA', 'High Out Eng Units', and 'Low Out Eng Units'. The 'Misc' tab is highlighted with a dashed border.

For example: If the high input to the data logger from the instrument is 10V when the output reading of the instrument is 50°C, then a High Input of 10V indicates a corresponding High Output of 50°C. Or if the low input to the data logger from the instrument is 0V when the low output reading of the instrument is 0°C, then a Low Input of 0V indicates a corresponding Low Output of 0°C

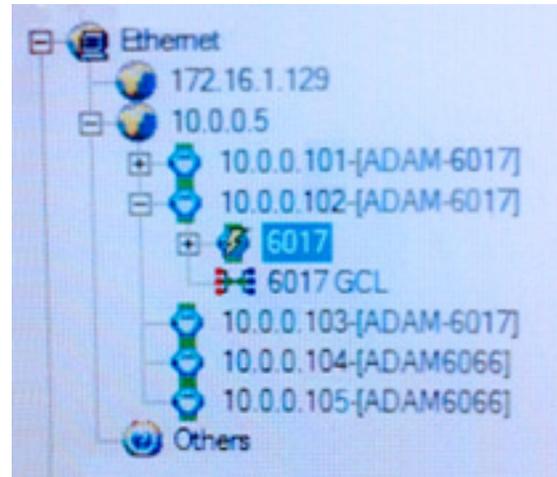
This is an identical screenshot to the one above, showing the 'Misc' tab configuration for the 'Analog Input' channel. The fields are: 'Analog Input Number', 'High In Voltage/mA', 'Low In Voltage/mA', 'High Out Eng Units', and 'Low Out Eng Units'. The 'Misc' tab is highlighted with a dashed border.

## Changing Volts Full Scale Settings ADAM/APAX Utility

The analog inputs are factory defaulted to 10 volts full scale. In some cases, it is desirable to change the volts full scale to improve accuracy (for a 0-1 or 0-100mV instrument).

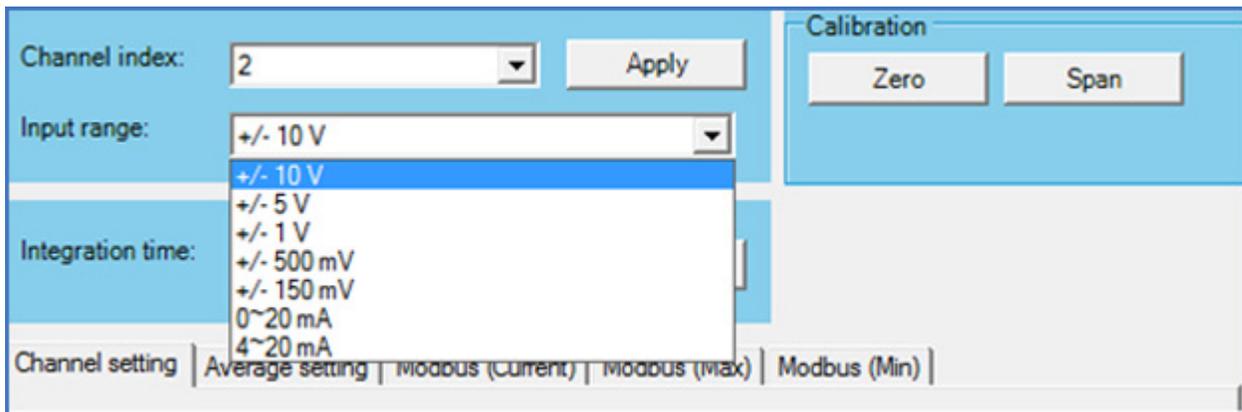
To make this change:

1. Open the ADAM/APAX administration utility under the Start Menu. The left side menu should populate with the installed modules and their IP addresses (Modules 1 through 3 10.0.0.101 through 10.0.0.103), and correspond to input cards 1-3 accordingly.
2. If they do not immediately appear, right click on **10.0.0.5** and select **Search**.
3. Select the card (module) and expand to show the **6017 watch** icon. You will be asked for a **Password**- enter eight zeroes (**00000000**).
4. You will then see a list of the inputs, including their current readings. On the top pick list, pick the appropriate index (0-7 = Inputs 1-8 on the first card, 9-16 on the second card, etc).



Volts Full Scale

To recap, if we want to change the range on analog input 11, we would choose the module 10.0.0.102 and Index 2. Once you have selected the correct index, select the Input Range.

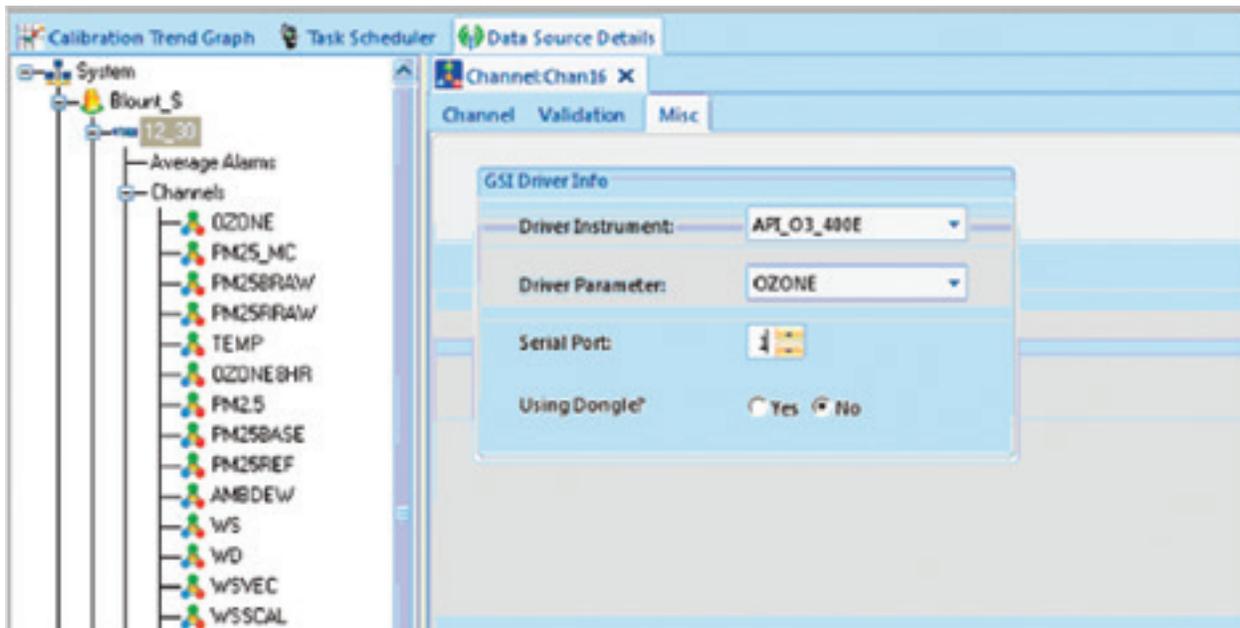


Select Input Range

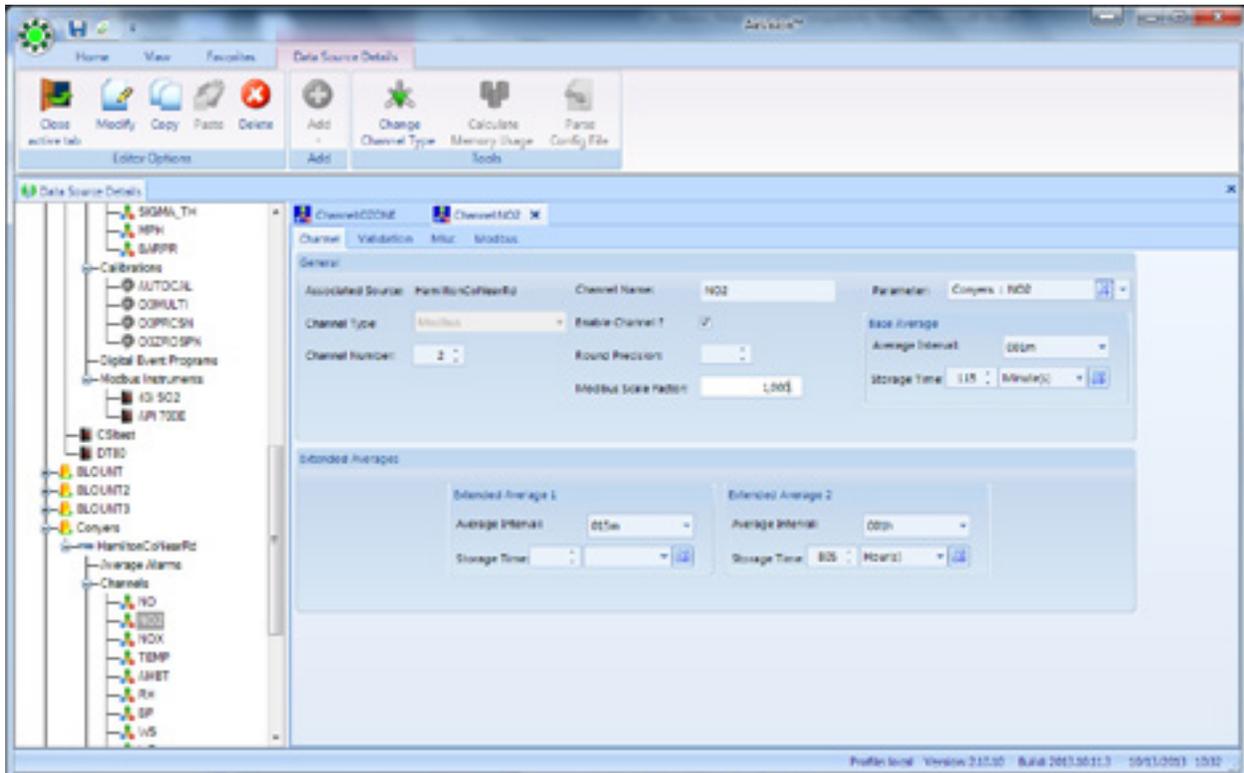
Click **Apply**. Continue with any other range changes, then close the APAX application. You will also need to ensure that the **High Out / Low Out** in **Data Source Details** is set correctly. The **High Out** corresponds to the new full scale range, and the **Low Out** corresponds to a zero reading.

The **GSI or RS-232 channel** uses a serial communications interface used by the data logger to retrieve data from devices such as analyzers and digital control systems. The interface can receive data strings and stores values into GSI Channels for data collection. For these channel types, the “Misc” screen allows the user to define which RS-232 port is to be used, the type of instrument being connected, and the value within that instrument that is desired. Note that the baud rate of the RS-232 port is set in the PC Settings editor.

On the Misc tab an option is given for Hold Data Between Updates? is set to Yes or No. If Yes is selected it will use the last value received until the next value arrives, for instruments that send data infrequently. Normally, this is set to “No.”

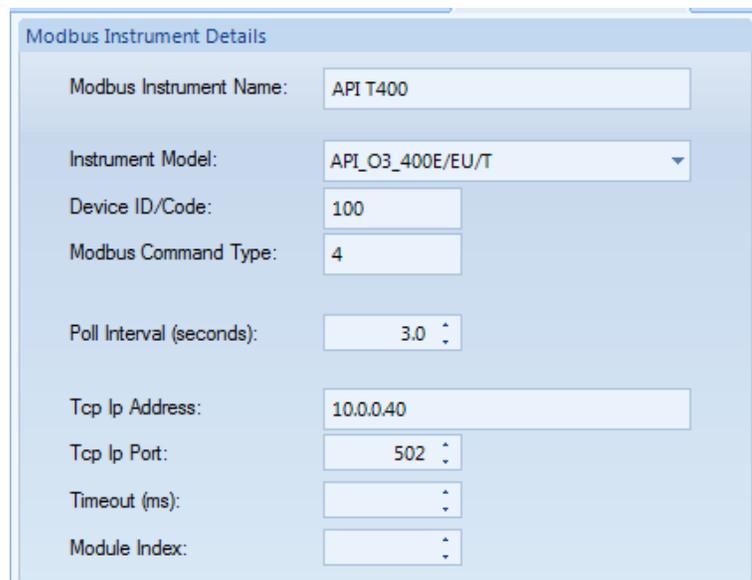


The **Modbus channel** is used to take data from a Modbusused to take data from a Modbus-capable instrument via an Ethernet connection.A Logger Modbus Instrument needs to first be created before the Modbus channel is created so that the instrument that was created will show in the drop down list for the Modbus Instrument on the Modbus tab (similar to the GSI/RS-232 channel).



Modbus instruments have additional networking information that needs to be known. You must create an instance of the Modbus instrument in the Logger Channels editor before creating the Modbus channels for that instrument (This procedure prevents the need to repeat entry of the networking information for each channel).

To create the instrument, go to the Logger Channels editor, select the data logger in the tree diagram, and select **Add > Logger Modbus Instrument**.



Modbus Instrument Details in Logger Channels

Enter the following fields:

- ◆ **Instrument Name**--a user-defined label for the instrument
- ◆ **Driver Type**--select from picklist of known analyzers
- ◆ **Modbus Code**--also known as the **Modbus Device ID**, this ID is set in the analyzer, and is some value from 1-255
- ◆ **Modbus Command Type**--defines which Modbus command is used to read data from the analyzer (3 for TECO, 4 for API, consult instrument documentation for other brands)
- ◆ **Poll Interval**- how often data should be requested from the instrument, in tenth of a second increments. Generally, a rate of 2-3 seconds is recommended for most analyzers.
- ◆ **TCP Address**--IP address of the instrument, as viewed from the logger's perspective
- ◆ **TCP Port**--Port used by the instrument for Modbus requests, usually "502".
- ◆ **Timeout (MS)**--Designates the time the logger will wait on an instrument for a Modbus response. Typical values are 250-750 MS, if needed, for an analyzer missing readings occasionally.

Modbus channels in the 8872 will use the **Modbus Scaling Factor** to convert floating point data from the instrument before using it in averages, calibrations, etc. This can be used to convert an analyzer that only provides PPB data on the Modbus link to PPM data, or similar conversions. This approach is preferred over **Analyzer Units** in the logger, since the **Analyzer Units** conversion only takes place on averages and calibration data, but causes inconsistency with other logger configuration settings (alarm limits, calibration expected values, etc., and can cause issues with a synchronized Central.).

## Math Channels

The **Math Pack channel** supports calculations between channels and math constants as Math or Average Math channels. Math channels evaluate the equation with every scan of the system, while Average Math channels apply the equation only against the calculated averages of the constituent channels.

Arguments as inputs to the math channel can be channel names (e.g., "SO2"), math constants (e.g., "K01"), or fixed numbers.

Binary operators (operators on two variables) include:

- \* Multiply
- / Divide
- + Add
- Subtract
- % Modulo (remainder)



The screenshot shows a configuration window with three tabs: 'Channel', 'Validation', and 'Misc'. The 'Misc' tab is selected. Below the tabs, there is a checkbox labeled 'Round Constituents' which is currently unchecked. Below that is a text input field labeled 'Math Equation' with a vertical cursor inside, indicating it is ready for input.

Other binary and Uniary functions (functions that operate on one variable or one result of another embedded equation) include:

NAME	DESCRIPTION	USAGE
Abs	Returns the absolute value of a specified number.	Abs(-1)
Acos	Returns the angle whose cosine is the specified number.	Acos(1)
Asin	Returns the angle whose sine is the specified number.	Asin(0)
Atan	Returns the angle whose tangent is the specified number.	Atan(0)
Cos	Returns the cosine of the specified angle.	Cos(0)
Exp	Returns e raised to the specified power.	Exp(0)
Log	Returns the logarithm of a specified number.	Log(1, 10)
Log10	Returns the base 10 logarithm of a specified number.	Log10(1)
Max	Returns the larger of two specified numbers.	Max(1, 2)
Min	Returns the smaller of two numbers.	Min(1, 2)
Pow	Returns a specified number raised to the specified power.	Pow(3, 2)
Round	Rounds a value to the nearest integer or specified number of decimal places. The mid number behaviour can be changed by using EvaluateOption.RoundAwayFromZero during construction of the Expression object.	Round(3.222, 2)
Sign	Returns a value indicating the sign of a number.	Sign(-10)
Sin	Returns the sine of the specified angle.	Sin(0)
Sqrt	Returns the square root of a specified number.	Sqrt(4)
Tan	Returns the tangent of the specified angle.	Tan(0)
Truncate	Calculates the integral part of a number.	Truncate(1.7)
JDAY()	Returns julian day of the year (1-366)	
MINHR()	Returns minutes into the hour (00-59)	
SECMN()	Returns seconds into the minute (00-59)	
HRDAY()	Returns hours into the day (00-23)	

⇒ **Important!** These equations MUST be referred to by the case-specific version of the equation. You must use “Max(x,y)”, not “MAX(x,y).”

Equations do NOT terminate with an “=” sign (unlike the 8816 or 8832), so an example equation might look like:

**SO2 \* 0.00166 \* K17 \* FLOW**

On the Misc. tab Round Constituents will round to the number of places specified in the Decimal Positioner field, before the equation and average are calculated (used primarily in special CEM applications). Channel names that contain spaces cannot be used in a math pack formula.

The **Average math pack** channels function like math pack channels except instead of performing calculations on instantaneous readings and then averaging the results, these channels wait until the end of an averaging interval and perform calculations on the averages. The Average Math Channel configuration screen is identical to the Math Channel configuration screen except for the channel type.



The screenshot shows a configuration window with three tabs: "Channel", "Validation", and "Misc". The "Misc" tab is selected. Below the tabs, there are two configuration options:

- Round Constituents**: A checkbox that is currently unchecked.
- Math Equation**: A text input field containing a vertical cursor (|).

The **General channel** is used to run special calculations based on the input of another channel that is already configured (e.g., analog input, Modbus, etc). The different calculation types include:

- ◆ Maximum (find highest sub-interval in a given interval, e.g., highest minute in hour)
- ◆ Minimum (same, but finding the lowest)
- ◆ Accumulate (totals sub-intervals into final average)
- ◆ Number of Valid Averages (number of sub-intervals that are valid)
- ◆ Percent Valid (similar, but result expressed as a percentage 0-100)
- ◆ Difference (calculate difference of current average from previous average)

The Maximum method is commonly used on SO<sub>2</sub> channels to find the highest 5 minute average in an hour, or for peak wind speeds. The Difference method is often used against a “raw” rainfall analog input to calculate the difference in the voltage to determine rainfall in an hour.

On the Misc. tab:

- ◆ Input Average Interval is the data type the general channel is to be based on, such as minute or hourly data (e.g., the “sub-interval” for the calculation).
- ◆ Input Channel Number is the channel number of the configured channel that will be the data source.
- ◆ General value Duration is the average basis for the General Channel Result.
- ◆ The Data Channel Type sets the calculation type; accumulative, maximum, minimum, number of valid runs, percent complete number of runs, or difference.
- ◆ Ignore Input Channel Flags are the flags to be ignored when verifying the validity of the current data point.
- ◆ Reset Input Status Pattern allows the user to set a digital status input pattern that, if observed, a reset will be generated to the calculation so far (e.g., previous sub-intervals will be ignored). This is not commonly used.

The screenshot shows the 'Misc' configuration tab for a channel. The 'Specific' section contains the following settings:

- Input Average Interval:** A dropdown menu.
- Input Channel:** A dropdown menu.
- General Value Duration:** A spinner control followed by a dropdown menu and a refresh button.
- General Value Storage Time:** A spinner control followed by a dropdown menu and a refresh button.
- Data Channel Type:** A dropdown menu.

On the right side of the 'Specific' section, there are two buttons:

- Ignore Input Channel Flag(s):** A button labeled 'Channel Flags'.
- Reset Input Status Pattern (Max of 8):** A button labeled 'Status Pattern'.

The **Rolling channel** calculates an extended rolling average from another channel's average, such as hourly averages rolling on the minute. The rolling average is updated when the base average is updated. For example, if the base average interval is one minute and the rolling average interval is one hour, the rolling average channel will store a new data point every minute; each data point will be an average of the previous 60 one-minute averages.

On the Misc. tab:

- ◆ Input Channel is the input channel number used for the rolling channel average.
- ◆ Input Interval is the data used to input into the rolling channel averages, and is the frequency at which the rolling average channel will create data.
- ◆ Duration is the length of the 'buffer' of input intervals used to calculate each average.

## Meteorological Channel Types

The **Vector Wind Speed channel** computes average wind speed as a vectored average. A corresponding Vector Wind Direction Channel must also be configured to support the Vector Wind Speed Channel. Input types can be analog inputs, or GSI (RS-232) based sensors, with a specific channel type for each approach. For the analog input type, the "Misc" tab is similar to the Analog Input Channel, while for the GSI version, the "Misc" tab looks like the GSI channel. The main difference is the manner of calculation, handling zero crossover, 0-360 and 0-540 degree instruments, etc.

For vector wind channels, an additional input is given for the companion channel (e.g., the Vector Wind Direction Channel for VWSP, and the Vector Wind Speed Channel for VWDR). The selection is the channel number for 8816s and 8832s, while 8872s use a pick list from already configured channels.

Before this field can be filled in both the vector wind and vector speed channels have to be created and saved, then you can go back and fill in the companion channel field.

The **Vector Wind Direction channel** performs the direction part of the vector calculation, and is similar to the Vector Wind Speed channel listed above, including the Companion channel field.

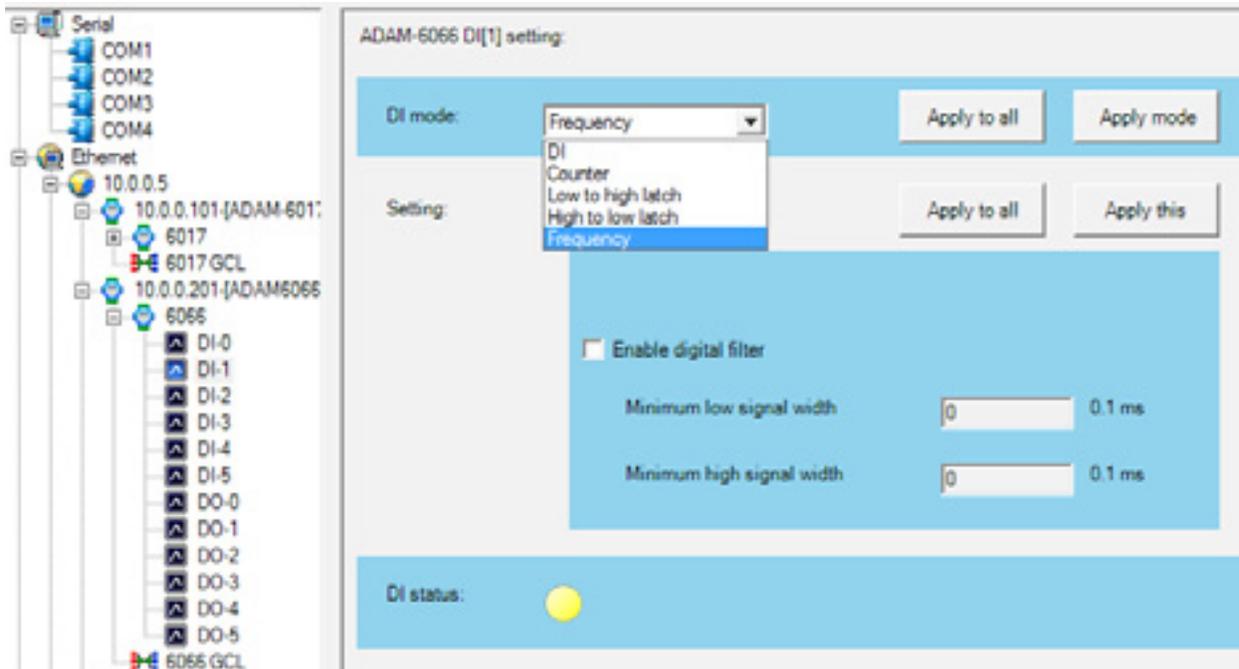
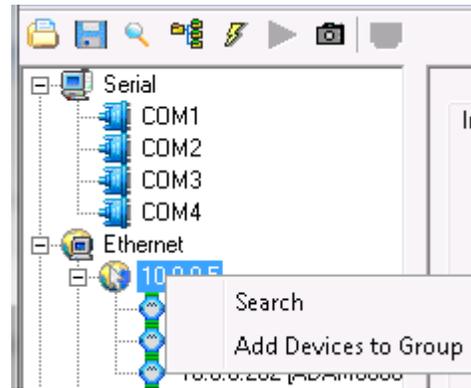
The **Wind Speed channel** is configured the same as the Vector Wind Speed channel minus the Vector Wind Direction channel companion field.

The **Wind Direction channel** is configured the same as the Vector Wind Direction channel minus the Vector Wind Speed channel companion field.

### Configure Frequency Based Wind Speed on 8872

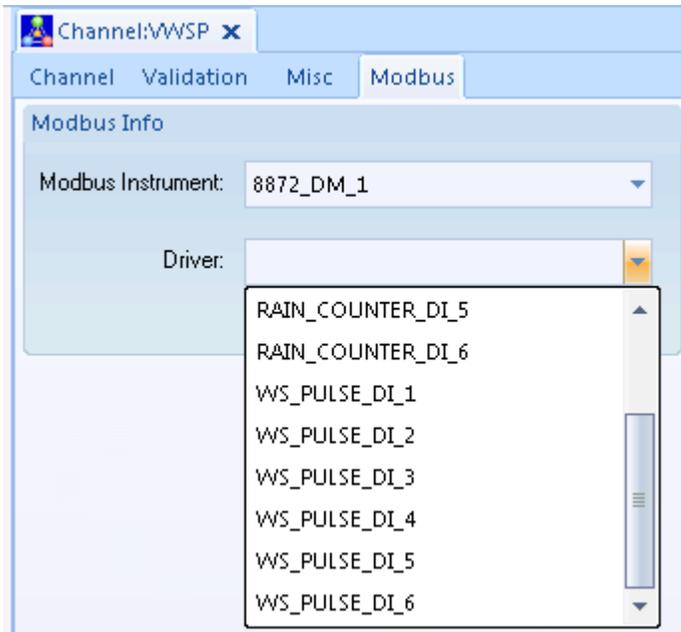
A Met Card is not required for pulse / frequency input wind speed, such as from the Met One 010C. The 8872 can use its status inputs for wind speed. The maximum input is ~ 2 Khz.

1. Wire your sensor to the desired Status Input pair (+ and -) .
2. In the APAX utility, right click on the 10.0.0.5 entry and chose Search.
3. Click on the entry based on the Status Input you used:
  - a. 10.0.0.201 for inputs 1-6
  - b. 10.0.0.202 for inputs 7-12
4. Expand the 6066 entry and click on the appropriate status input.
  - a. NOTE: the DI will be one value lower than the Status Input you chose on the back of the 8872 (ex. Status Input 1 would be DI-0 in APAX)
5. Change the DI Mode from “DI” to “Frequency”.

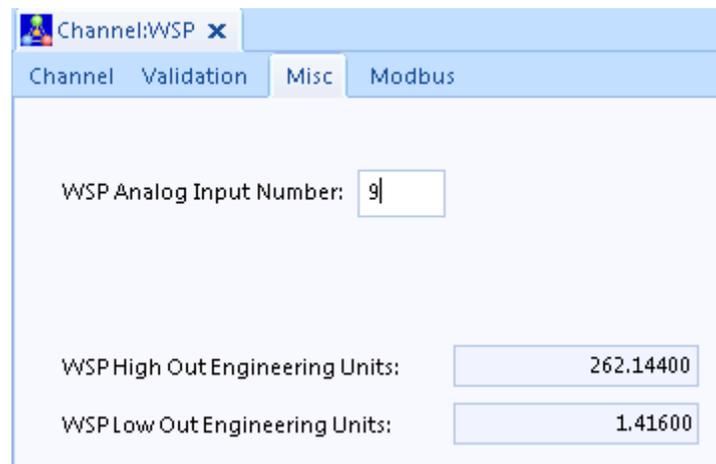


6. Once changed, click 'Apply mode'.
7. In AVTrend, go to Logger Channels and select your wind speed channel.
8. On the Modbus tab, link the channel to the correct input module, and the correct input on that module.

**\*\*NOTE:** DI-0 in Apex equates to Status Inputs 1+ and 1- on the rear of the logger and to DI\_1 in AVTrend; DI-1 would equate to 2+, 2- and DI\_2; etc.\*\*



9. On the Misc tab, set the High Out and Low Out units.



To determine the values to enter use the equation: Output Value) / (Translation Value).

EX. A Met One 010C may be spec'd at a range of 0.27 to 50 meters per second, with 1250 Hz equivalent to 50m/s.

High Out would equal (50)/(1250)      Low Out would equal (0.27)/(1250)

The **Sigma Theta** takes the input of a wind direction channel and calculates a USEPA sigma theta (Yamartino method). For a Model 8816 or 8832, the input must be designated as an analog input, while in an 8872, the input is set to a Wind Direction or Vector Wind Direction channel. The RMS interval is the sub-interval for the root-mean-square combination of sub-intervals, and for most applications is set to 15 minutes.

Channel Validation **Misc**

RMS Average Details

Average Interval:

Storage Time:

WDR Analog Input Number:

WDR High Input (V):

WDR Low Input (V):

WDR High Output (E.U.s):

WDR Low Output (E.U.s):

The **Linear Sigma** channel takes data from an analog input to calculate a standard deviation/mathematical sigma (measure of standard deviation) of an analog input or another channel.

Channel Validation **Misc**

WDR Analog Input Number:

WDR High In Voltage:

WDR Low In Voltage:

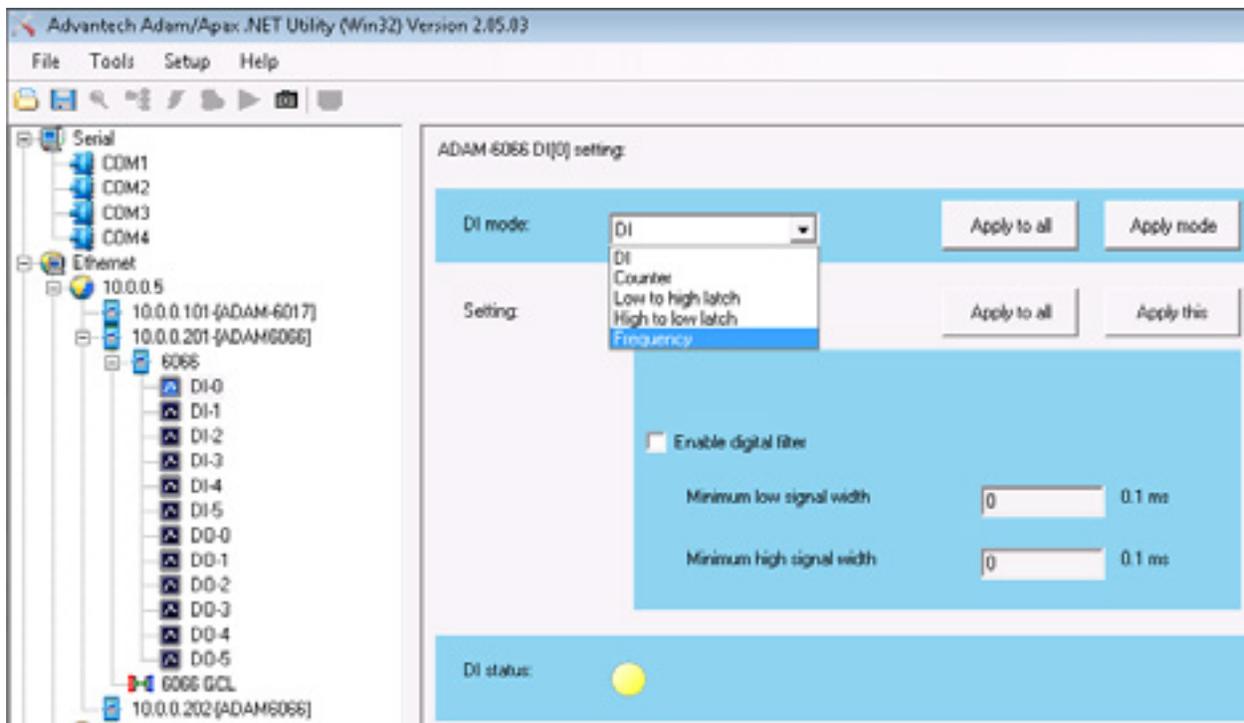
WDR High Out Voltage:

WDR Low Out Voltage:

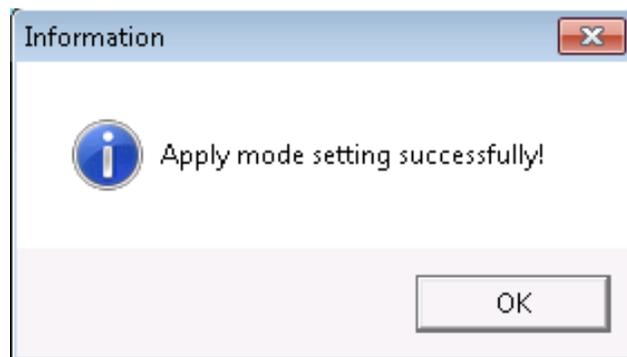
## Configuring 8872 Digital Inputs for Rainfall Counter Inputs

Rather than having a separate Met Card, the 8872 can use its status inputs for rainfall counts. For an 8872 build sheet specifying a counter or a frequency input the steps below should be completed.

1. Launch the Apax Utility and expand the 6066 module based on the specified input number.
  - a. For inputs 1-6 use the 201 module, for inputs 7-12 use the 202 module.
2. Select the input as listed on the sheet, offset by 1 (input 1 would be DI-0, input 2 would be DI-1, etc.)
3. In the 'DI mode' pick list select Counter. Do not use this input for other status input functions.



4. Click the 'Apply mode' button to save the changes, the following message should be received.



5. Once the mode change is applied, the screen will appear as follows (depending on mode selected).

The screenshot shows a configuration interface with three main sections:

- DI mode:** A dropdown menu is set to "Counter". To its right are two buttons: "Apply to all" and "Apply mode".
- Setting:** A section containing several checkboxes:
  - Invert signal
  - Keep last value when power off
  - Enable digital filter
 Below these are two input fields for signal widths:
  - Minimum low signal width: 0 (input field) 0.1 ms
  - Minimum high signal width: 0 (input field) 0.1 ms
 To the right of the checkboxes are two buttons: "Apply to all" and "Apply this".
- Counter value:** A text input field shows "0 times". To its right are two buttons: "Stop" and "Clear".

On the Channel setup in AVTrend the Analog Input Channel Number under the Misc tab would not be used. Under the Modbus tab, link the channel to the correct input module, and the correct input number on that module.

This example is for Status Input #1 would be "RF\_DI\_1" on "8872\_DM\_1".

Status Input #2 would be "RF\_DI\_2" on "8872\_DM\_1".

Status Input #7 would be "RF\_DI\_1" on "8872\_DM\_2".

The screenshot shows the "Modbus" configuration tab in AVTrend. It contains the following fields:

- Modbus Info:**
  - Modbus Instrument: 8872\_DM\_1 (dropdown menu)
  - Driver: RF\_DI\_1 (dropdown menu)

### External Channels

The Model 8872 supports a new channel type “E” for External Channels. These allow the user to create a ‘fake’ channel associated with parameter from a directly polled instrument (e.g., BAM, API 602, E-Sampler, etc), where the logger is not doing real-time acquisition (e.g., directly polled instruments in an 8872). It exists ONLY to create a channel number for use with logger polling. The External type channel requires no other special configuration, and is ignored by the Site Node Logger process.

## CEM Channel Types

The **Stream-Switched Averaging channel** allows the data logger to monitor one analyzer that is time-shared between two sampling trains. It forms a base average and two extended averages from another channel, and accepts data from that input channel only when an on-line digital input status is met. If this condition is not met, the data can be designated as invalid, or the data (last good reading, base average, extended average, or average) over the previous on-line period may be “held” until the on-line status condition is met. When stream switch channels are controlled by digital event programs or are calibrated using automatic calibration programs, the digital program or calibration timing may not line up exactly with the stream switch channels averaging periods. Calibrations and event programs should be configured to end a few seconds before the start of the next base average.

On the Misc. tab:

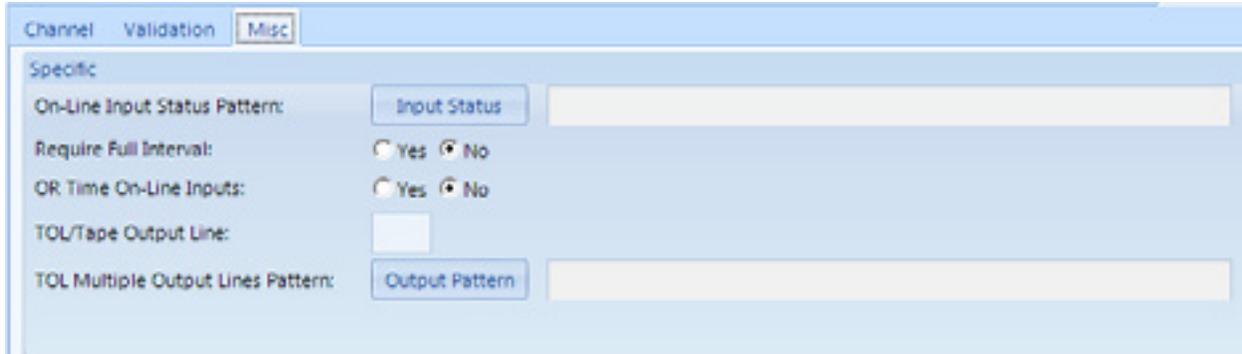
- ◆ On-Line pattern defines the status input pattern (physical or pseudo-inputs) used to define when the stream is “on” for data collection purposes.
- ◆ Offline Action defines how to handle data when the on-line pattern is not active:
  - Hold Last (instantaneous) Reading
  - Hold Last Base Average
  - Invalid (invalidate data)
- ◆ Purge Time defines how long to continue with the “offline” action when the status inputs transition from the off-line condition to the on-line condition.

The **Time On-Line and Multi-Condition TOL (Time Online) channels** allow the data logger to record when a process or generating unit is online for CEM reporting purposes. The resultant ‘average’ is typically a count of the base intervals (e.g., base average = 0 or 1, hourly averages range from 0-60, counting the number of online minutes, etc).

The basic Time On-Line channel allows the user to define an “Online Input” (status input pattern of physical and/or pseudo-inputs). When that pattern is seen as true, the TOL channel counts the process as on.

The Multi-Condition Time On-Line channel allows a more complex definition of up to three conditions, each of which can be a status input or a threshold of a channel value, for example:

- “Flame On” (status input #01) is true (closed) AND
- “Fuel Flow” (Modbus channel #7) is > 4 gallons/minute AND
- “Stack Temperature” (analog input #7) is > 300 degF.



### Vector Wind Speed / Direction

The settings for this channel are the same as those for the Standard input channel, an additional pick list is provided to designate the Companion wind speed / direction channel (e.g. for the wind speed channel, designate the wind direction companion, and vice versa). Note that this will mean setting one channel up initially without the companion defined, setting the second channel, and then going to the initial channel to define the companion channel setting.

### Rolling Average

#### Misc Tab

##### ◆ **Input Channel**

Defines which channel is to be used for the input of the rolling average. It may be of any channel type.

##### ◆ **Input Interval**

Defines the input interval from the input channel for the rolling average calculation. This will also define the rate at which averages are stored for the rolling average.

##### ◆ **Duration**

This designates length of the rolling average “buffer”, or how many averages are used in the rolling average calculation. Invalid averages are kept in the buffer, but not used in the resultant calculation.

##### ◆ **Exclude Offline Data**

Not used in the Model 8872

##### ◆ **Clear At Rolling Interval**

This tells the logger to “clear” the rolling buffer at the end of the duration interval. This is commonly used for ‘building’ averages that need to be reset every hour, day, etc.

##### ◆ **Storage Time**

Not used in the Model 8872

## General

**Misc Tab**◆ **Input Channel**

Defines which channel is to be used for the input of the calculation. It may be of any channel type.

◆ **Input Interval**

Defines the input interval that is to be used for the calculation.

◆ **General Value Duration**

This designates length of the period for which the calculation is to be performed. E.g., to find the highest 1 minute average in an hour, the Input Interval would be 1 minute, but the General Value Duration would be 1 hour.

◆ **General Value Storage Time**

Not used in the Model 8872

◆ **Data Channel Type**

May be defined as “Maximum” or “Minimum”.

◆ **Ignore Input Channel Flags**

Defines flags that, if found on the input interval, cause that average to be ignored for calculation purposes.

◆ **Reset Input Status Pattern**

Defines a digital input pattern that can be used to “reset” the minimum or maximum recorded so far in a period.

## Validation and Flags

Flags in AirVision can generally come from the data source (data logger, instrument), or applied later via data editing.

For data coming from data loggers (8816, 8832, or 8872), the flag list and sources of the flags are as follows. Flags are listed below in order of priority (from the data logger's perspective). Some flags are 'instantaneous' flags applied to readings (and visible on all resultant averages), while some flags are only applied to the particular average interval they are set for, like a high or low limit. Flags in **red** will invalidate the readings for the period the condition exists.

FLAG	TYPE	DESCRIPTION	SOURCE OF FLAG
<	Average	Insufficient data for valid average	Automatically applied by logger if less than 75% or defined % valid in Validation Settings.
>	Average	Sufficient data for valid average, but some data missing	Automatically applied by logger if > 75% (or user defined threshold) but < 100% of readings valid.
<b>P</b>	<b>Instantaneous</b>	<b>Power failure</b>	Power failure experienced (invalidates one base average).
<b>D</b>	<b>Instantaneous</b>	<b>Channel Offline</b>	Channel disabled via user interface (Logger Toolbox in 8872).
<b>T</b>	<b>Instantaneous</b>	<b>Out Of Control due to bad Cal</b>	Normally a CEM feature, if cal drift > OOC limit set in Calibration program, then channel invalid until a good cal is passed.
<b>F</b>	<b>Instantaneous</b>	<b>Boiler Offline (CEM)</b>	Normally CEM feature, boiler is considered offline based on status input pattern configured in Validation settings.
<b>B</b>	<b>Instantaneous</b>	<b>Bad Instrument Stations</b>	Instrument is considered offline based on configured status input pattern. Will also appear during periods of Modbus or RS-232 communication 'dropouts' between logger and instrument.
<b>C</b>	<b>Instantaneous</b>	<b>Instrument in Calibration</b>	Logger running calibration program affecting this instrument/channel.
<b>M</b>	<b>Instantaneous</b>	<b>Instrument in Maintenance</b>	Channel disabled via user interface (Logger Toolbox in 8872) or via configured status input.
<b>O</b>	<b>Instantaneous</b>	<b>Analog Overrange</b>	Single reading > full scale of analog range, invalidates the base average.

FLAG	TYPE	DESCRIPTION	SOURCE OF FLAG
<b>U</b>	<b>Instantaneous</b>	<b>Analog Underrange</b>	Single reading < negative end of full scale of analog range, invalidates the base average.
<b>A</b>	<b>Instantaneous</b>	<b>Math Error</b>	Error executing math pack channel equation, most commonly divide by zero.
<b>+</b>	<b>Instantaneous</b>	<b>Maximum Reading Error</b>	Reading > configured "Maximum Reading", invalidates the base average.
<b>-</b>	<b>Instantaneous</b>	<b>Minimum Reading Error</b>	Reading < configured "Minimum Reading", invalidates the base average.
<b>R</b>	<b>Instantaneous</b>	<b>Rate of Change Error</b>	Reading changed from one reading to another > the configured rate of change limit.
H	Average	High High Limit Exceeded	Average (e.g., 1m, 1h) value > configured limit.
L	Average	Low-Low Limit Exceeded	Average (e.g., 1m, 1h) value > configured limit.
h	Average	High Limit Exceeded	Average (e.g., 1m, 1h) value , configured limit.
l	Average	Low Limit Exceeded	Average (e.g., 1m, 1h) value < configured limit.
J	Average	High High Rate of Change	Change from previous average > set limit.
j	Average	High rate of change	Change from previous average > set limit.
V	Instantaneous	Digital Information#1	Configured status input pattern detected.
W	Instantaneous	Digital Information#2	Configured status input pattern detected.
X	Instantaneous	Digital Information#3	Configured status input pattern detected.
Y	Instantaneous	Digital Information#4	Configured status input pattern detected.
Z	Instantaneous	Digital Information#5	Configured status input pattern detected.
f	Average	Floor limit exceeded	Average < configured Floor Limit, value changed to floor value.
c	Average	Ceiling limit exceeded	Average > configured Ceiling limit, value changed to ceiling value.

The Validation settings can be found in the Logger Channels editor:

Parameter	Base Average	Extended Average 1	Extended Average 2	Information Flags
High-High Alarm Limit (H)	<input type="text"/>	<input type="text"/>	<input type="text"/>	Digital Info#1 (V) Status <input type="button" value="Select Lines"/>
High Alarm Limit (H)	<input type="text"/>	<input type="text"/>	<input type="text"/>	Digital Info#2 (W) Status <input type="button" value="Select Lines"/>
Low Alarm Limit (L)	<input type="text"/>	<input type="text"/>	<input type="text" value="-0.1000"/>	Digital Info#3 (X) Status <input type="button" value="Select Lines"/>
Low-Low Alarm Limit (L)	<input type="text"/>	<input type="text"/>	<input type="text"/>	Digital Info#4 (Y) Status <input type="button" value="Select Lines"/>
High ROC Alarm Limit (I)	<input type="text"/>	<input type="text"/>	<input type="text"/>	Digital Info#5 (Z) Status <input type="button" value="Select Lines"/>
Low ROC Alarm Limit (I)	<input type="text"/>	<input type="text"/>	<input type="text"/>	Bad Status Inputs (R) <input type="button" value="Select Lines"/>
Floor Limit (F)	<input type="text"/>	<input type="text"/>	<input type="text"/>	Maintenance Inputs (M) <input type="button" value="Select Lines"/>
Floor Value	<input type="text"/>	<input type="text"/>	<input type="text"/>	Boiler Offline (CEM) (F) <input type="button" value="Select Lines"/>
Percent Valid	<input type="text"/>	<input type="text"/>	<input type="text"/>	Max Readings (+) <input type="text"/>
Ceiling Limit (C)	<input type="text"/>	<input type="text"/>	<input type="text"/>	Min Reading (-) <input type="text"/>
Ceiling Value	<input type="text"/>	<input type="text"/>	<input type="text"/>	Rate of Change (R) <input type="text"/>
Overwrite Math Constant	<input type="text"/>	<input type="text"/>	<input type="text"/>	

When settings are made in the AirVision central server, they must be downloaded to the 8816/8832 or Sync'd with the 8872 to take effect. The server ONLY stores these settings for download/sync, and does not act upon the settings in the Validation screen itself. They are used in real-time by the logger's real-time data processing engine.

#### Other Notes:

Note also that flags may be applied by the Automatic Data Validation Processor (ADVP) or in the Data Editor (although any data edited in the Data Editor will also have an "E" editing flag).

Other status flags that appear in the Flags Detail and that can be applied via the Editor or ADVP are as follows. None of these invalidate data (unless set to do so in the Flags Editor):

I = Invalidated Via Edited

? = Suspect Data

> = Exceedance Data

z = Zero Adjusted

Q = Quality Assured

m = Maintenance Data

a = Audit

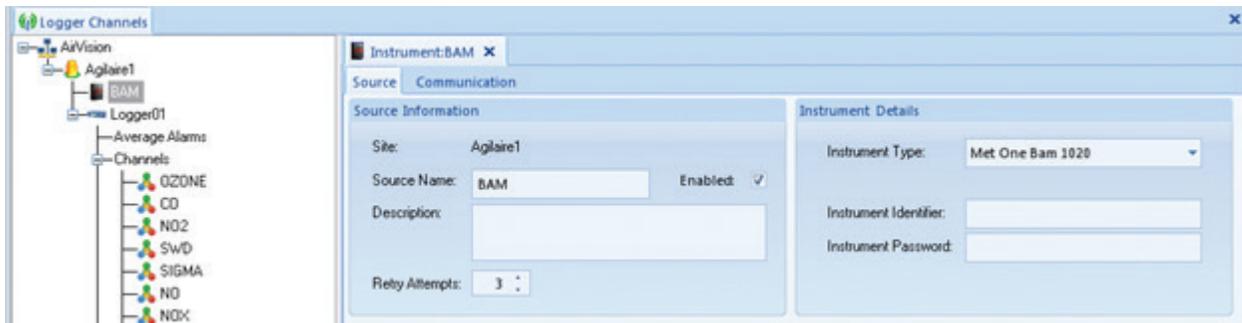
p = Precision Check

E = Edited Data (automatically applied via any edit via Average Data Editor)

Note that some users may change the definition/label of these "Server Side Flags".

## 2.4 Adding an Instrument

If the 8872 is licensed to poll and instrument directly, select **Configuration Editors/Logger Channels** and highlight the **site name** in the **Logger Channels** configuration tree diagram. Click the **Add button** and select **Instrument**. The **Instrument Type (ID)** field is required and can be selected from the drop-down list. Enter a **Source Name**, an **Instrument Identifier** and **Instrument Password**, and click the **Enabled** box. Click the **Save** icon.



Instrument Configuration from Logger Channels in Configuration Editors

You will also need to go into the Communications tab and set the communication route (e.g., "COM1", etc.)

## 2.5 Setting Up Calibrations

The Model 8872 follows the 8816 / 8832 approach to calibrations, where calibrations are defined as their own entities, and store data in calibration result records (rather than just flagging fine-resolution data). The Model 8872 supports four models of calibration, distinguished by how they are initiated and timed/controlled:

<i>Calibration Type</i>	<i>Description</i>
Automatic Calibration	Logger initiates the calibration at a pre-programmed time, repeats on a set interval, and controls the timing of the calibration through activating physical outputs on the Model 8872, or remote outputs via Modbus link to calibrators, instruments, etc.
Instrument Initiated	Similar to the Automatic Calibration, except that rather than having a start time and repeat interval, the user defines a start status input pattern (physical on 8872 or via remote Modbus I/O). When the correct pattern is seen, the calibration starts. It does not repeat again until the start pattern is seen again. Usually used for a “pushbutton” cal, or to follow a programmed timing from an instrument that can only provide an “in calibration” status signal.
User Initiated	Similar to the Automatic Calibration, except the calibration is only begun using the “start calibration” function in the Model 8872’s user interface.
Instrument Controlled	Logger follows the phases of a calibration via physical or remote status inputs, with a unique pattern defined for each phase. Instrument controls all of the timing, but the user can define the window of time at the end of each phase for which the data is taken (e.g., “take the last 90 seconds as data”). Usually used to follow sequences programmed into calibrators, where the calibrator sends a pattern via physical inputs or Modbus.

All calibrations have a Recovery stage at the end of the cal, during which data is invalidated, but is not associated with any input patterns or control outputs. This is to represent the time for the system to return to normal sampling condition.

All calibrations also have a list of **Affected Channels** that defines which parameters are to be invalidated during the calibration. Generally, the parameters are the same as the list of **Data Channels** (for which we record data), but there are some cases where a 1:1 correlation does not exist, for example, and SO<sub>2</sub> calibration through a common gas manifold may require that other gas parameters be marked invalid.

Other calibration sequence properties may include:

Affected Channels	
Select	Name
<input type="checkbox"/>	
<input checked="" type="checkbox"/>	NO
<input checked="" type="checkbox"/>	NO2
<input checked="" type="checkbox"/>	NOX
<input type="checkbox"/>	SAMPFLOW
<input type="checkbox"/>	SAMPLTMP
<input type="checkbox"/>	SMPLPRES

Cal Sequence Properties

◆ **Name of Cal Sequence**

The label used to identify this calibration program.

◆ **Enabled:**

Can be used to activate / deactivate the calibration program.

◆ **Starting Time (Automatic)**

The month, day, and time that the data system controller should begin this calibration sequence.

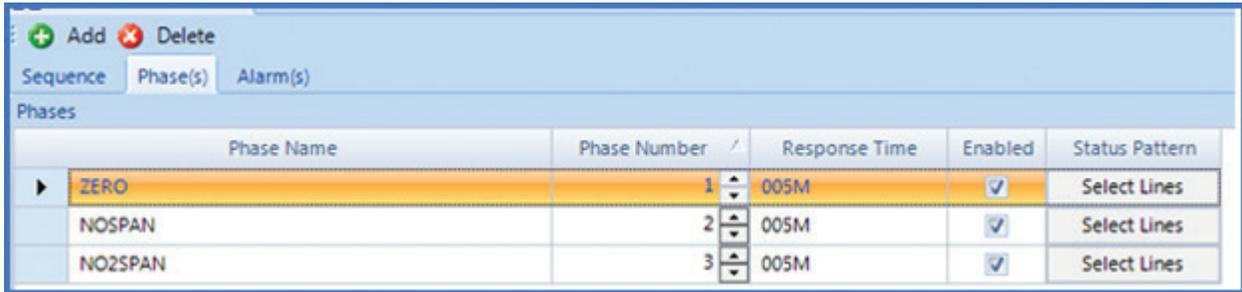
◆ **Interval (Automatic)**

How often this calibration sequence should repeat; usually every 24 hours (1d).

◆ **Start Pattern: (Instrument Initiated)**

Defines the status input pattern that starts the calibration.comcast.net

Within the **Phase** settings, properties may include:



Phase Name	Phase Number	Response Time	Enabled	Status Pattern
ZERO	1	005M	<input checked="" type="checkbox"/>	Select Lines
NOSPAN	2	005M	<input checked="" type="checkbox"/>	Select Lines
NO2SPAN	3	005M	<input checked="" type="checkbox"/>	Select Lines

Phase Settings

◆ **Phase Name**

The label used to identify this calibration stage/phase (e.g., Zero, Span, Prec)

◆ **Phase Number**

Defines the order of the phases in which they run (not used for Instrument Controlled calibrations, as their phases can occur in any order).

◆ **Duration Time (Automatic, User Initiated, Instrument Initiated)**

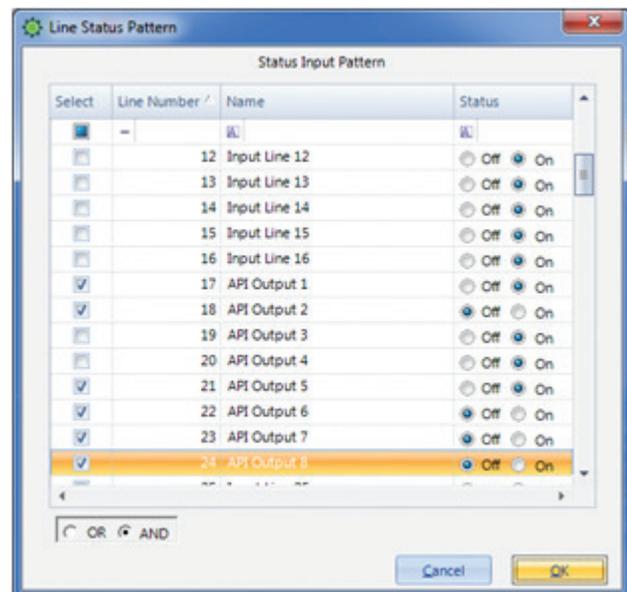
The period of time that the control outputs for that phase will be set.

◆ **Response Time**

The window of time at the end of that phase in which readings are averaged to form the resultant value for that phase.

◆ **Status Pattern**

Defines the status output or input pattern associated with that phase. For input patterns, the user should define which inputs are to be observed, and if they should be closed or opened for that pattern. **The pattern for each phase and calibration should be unique.**



Line Status Pattern for Phases

For each Phase Channel (combination of phase and recorded channel), the properties include:

Channel	Expected Value	Expected Value From Constant	Warning Drift Limit	EV for Auto Correct	Store Calibration Results	Write Result To Constant	Error Method	Write Expected Value To Constant
NO	0		0	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Difference	
NO2	0		0	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Difference	
NOX	0		0	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Difference	

### Phase Channel Properties

◆ **Channel**

Which parameter(s) are to be recorded for this phase

◆ **Expected Value**

The target value for the instrument during this phase.

◆ **Expected Value From Constant**

Not used in the Model 8872

◆ **Warning Drift Limit**

The user can define an absolute value difference between the observed value and the expected value and, if this limit is exceeded, an alarm output can be set.

◆ **EV for Auto Correct**

Not used in the Model 8872 (at this time)

◆ **Store Calibration Results**

Normally set, this can be used to inhibit recording a value that is taken for some other purpose (e.g., Write Value to Constant).

◆ **Expected Value From Constant**

Not used in the Model 8872

◆ **Error Method**

Used to designate the error method used for the Calibration Result. Choices are

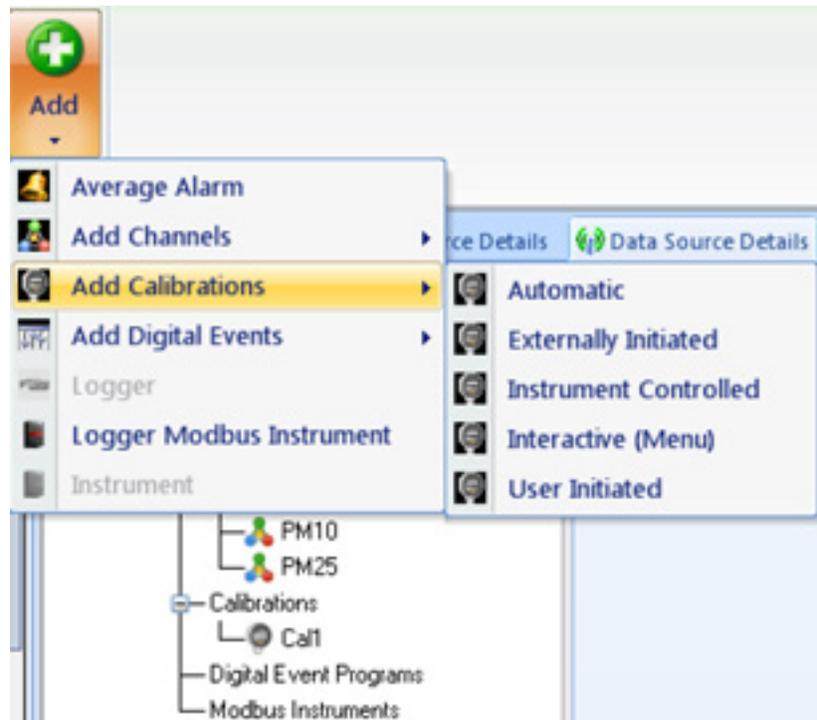
**Standard:** Shows cal error as  $ABS(\text{difference}) / \text{Cal Span}$

**Difference:** Shows cal error as actual difference of engineering units

**Linearity:** Shows cal error as  $ABS(\text{difference}) / \text{Expected Value}$

To configure calibrations:

- ◆ open **Configuration Editors > Logger Channels**
- ◆ highlight the **Logger** in the tree diagram
- ◆ click the small arrow under the **Add** button
- ◆ select **Calibrations** from the drop-down list
- ◆ select one of the following calibration types:
  - Automatic**
  - Externally Initiated**
  - Instrument Controlled**
  - Interactive (Menu)**
  - User Initiated**



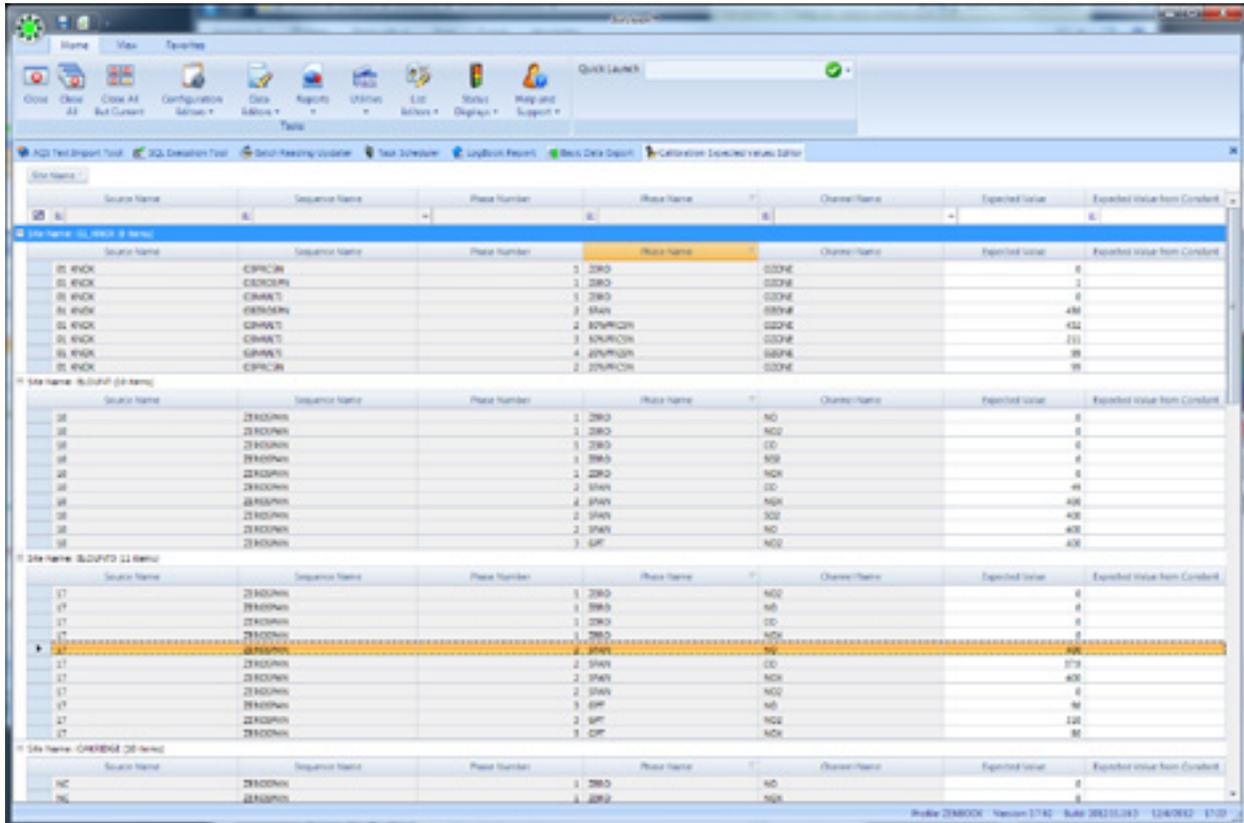
Adding calibrations in Configuration Editors > Logger Channels

For details about calibration types and the particulars of the settings, consult Section 2.5 Setting Up Calibrations - page 46.

- ▶ **Note:** Configuration information must be downloaded to the data logger before a new sequence can be initiated if using an 8832 or 8816.

### Calibration Expected Values Editor

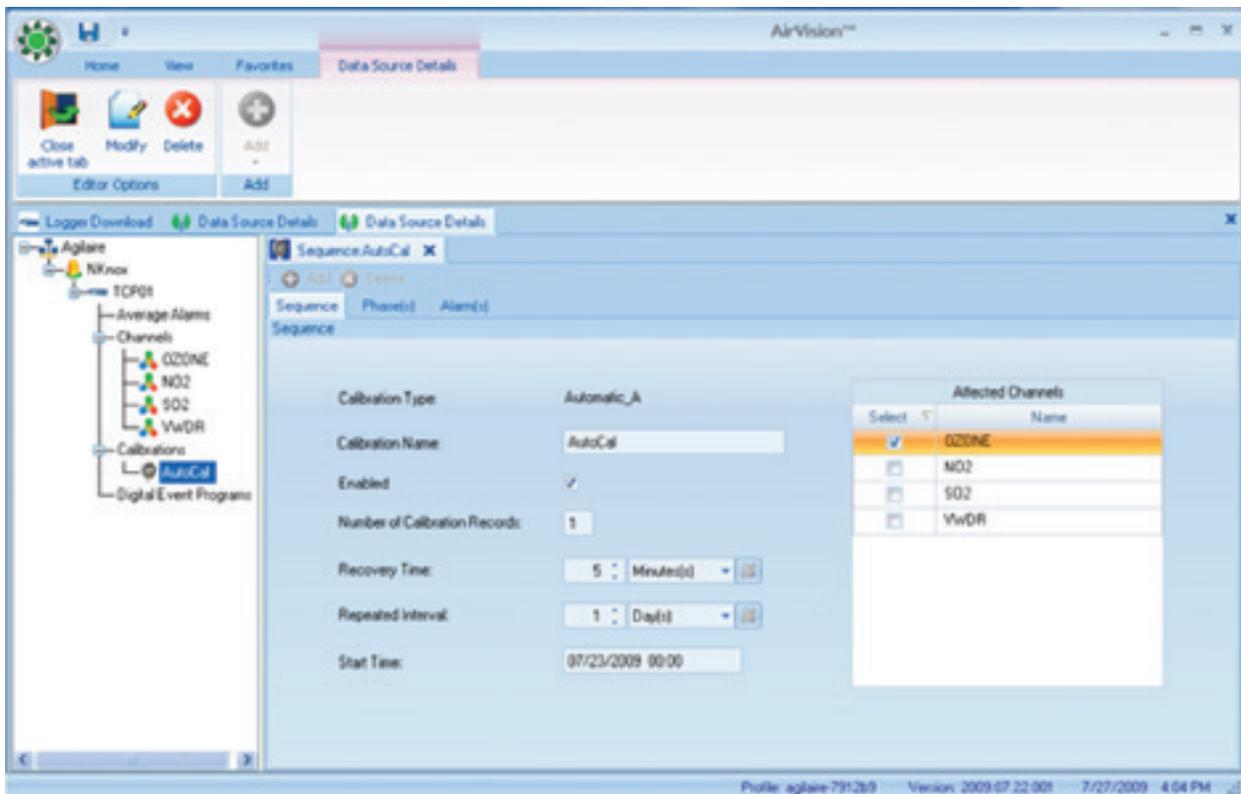
This mimics the “Quick Expected Values” editor in the Model 8832 data logger that allows the user to quickly update target values for the calibration without sorting through the Calibration configuration editor. The system shows all configured calibrations as expandable/collapsible boxes. Once opened, columns headers can be clicked to sort by phase name, expected value, etc. for easier data entry.



## Configuring Automatic Calibrations

If you configure **Automatic** Calibrations, the cal you enable will be automatically initiated by the data logger's internal clock. The Automatic Cal Sequence configuration screen has the following fields :

- ◆ **Calibration Type** will be already filled in (Automatic\_A).
- ◆ **Calibration Name** is required to identify the cal program.
- ◆ Check **Enabled** if the calibration is to run.
- ◆ **Number of Calibration Records** determines how many cals the data logger will store before overwriting.
- ◆ **Recovery Time** specifies the time required to purge cal gas after phases.
- ◆ **Repeated Interval** determines how often cal sequence will repeat.
- ◆ **Start Time** determines what time cal sequence will start.
- ◆ **Affected Channels** determines which channels will be taken off-line during cal. Select from a list of previously configured parameters.

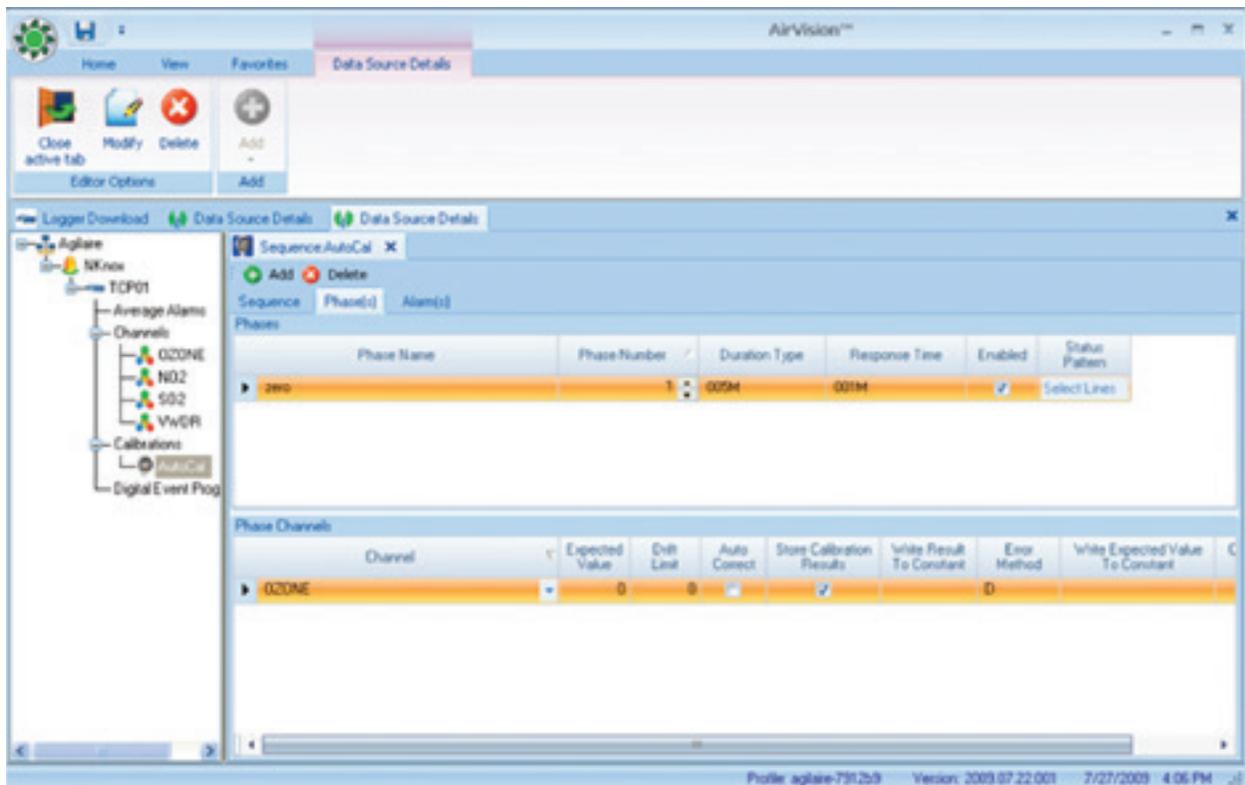


Automatic Calibration configuration in Configuration Editors > Logger Channels

## Configuring Phases

To set up Phases:

- ◆ click the **Phase(s)** tab behind the Sequence Cal tab.
- ◆ To enter a phase name, click the **Add** (above the tabs) and select **Phase** from the drop-down list.
- ◆ Enter a **Phase Name**, **Phase Number**, **Duration Type**, **Response Time**, and click to check the box in the **Enabled** column.
- ◆ To configure a **Status Pattern**, click in the **Status Pattern** column and a check list of **Output Control Patterns** will come up.
- ◆ After the Phase table is configured, click **Add** again and select **Phase Channels**.
- ◆ Select a **Channel** from a drop-down list, and optionally enter an **Expected Value**, **Expected Value from Constant**, **Warning Drift Limit**, **EV for Auto Correct** (click to enable), **Store Cal Results** (click to enable), **Write Result to Constant**, **Error Method**, **Write Expected Value to Constant**, and **Out of Control Limit**.

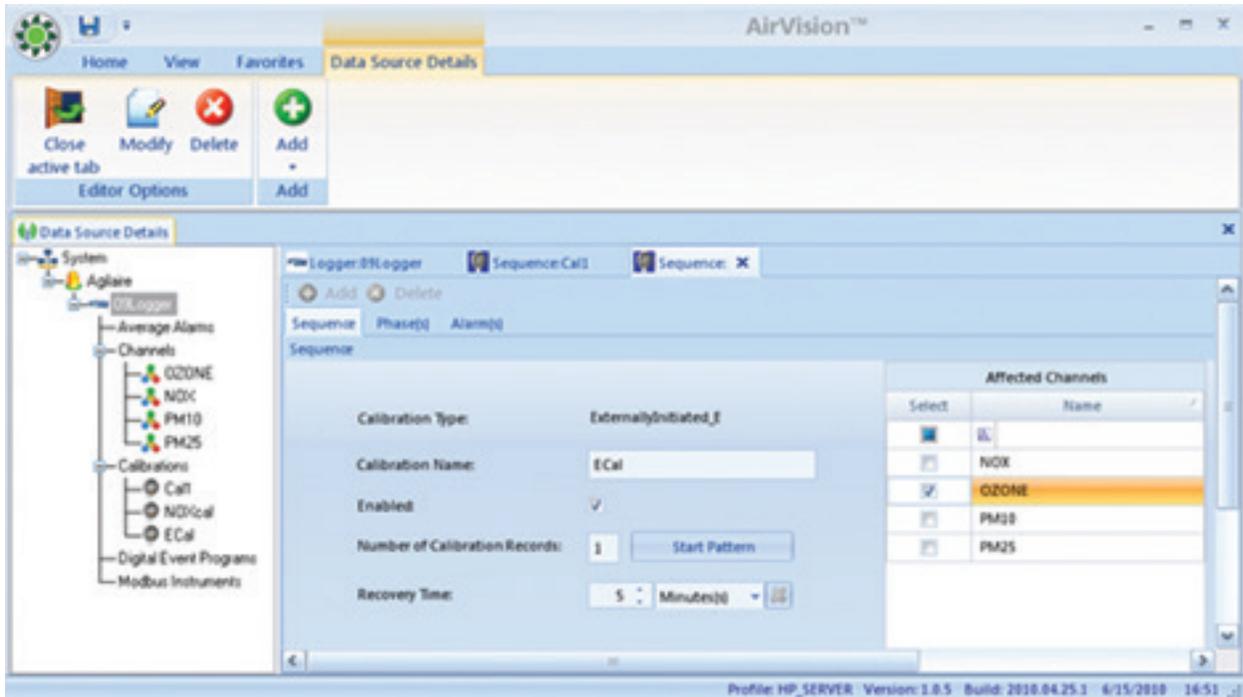


Configuring calibration phases in Configuration Editors > Logger Channels

### Externally Initiated Calibration

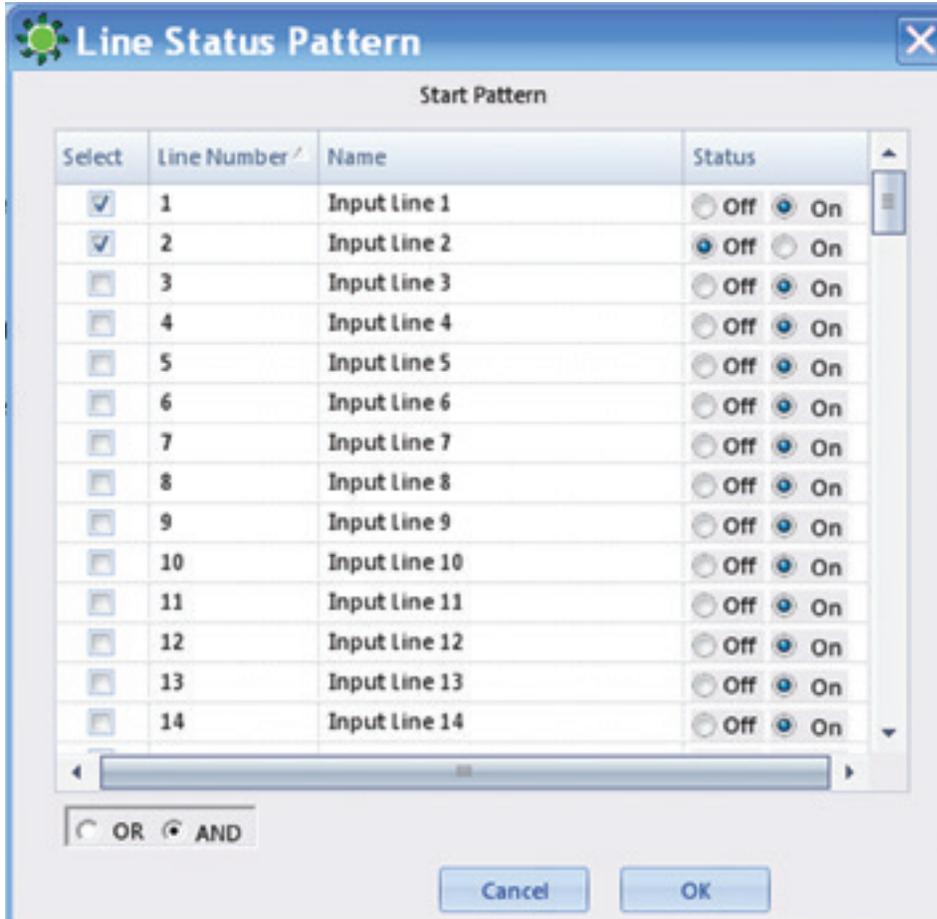
Externally initiated calibration is identical to an automatic calibration except for the way it is initiated. The sequence is started when a specified pattern of input control lines is met. To configure the **Start Pattern** (Line Status Pattern), click the **Start Pattern** button.

Individual phases are then initiated sequentially. As with an automatic calibration, the duration of each phase in the sequence can be specified.



Configuring Externally Initiated Calibrations in Configuration Editors > Logger Channels

When you click the **Start Pattern** button in the **Externally Initiation Calibration** screen, you will see a **Line Status Pattern** screen. Check the **Select** box to select an **Input Line** and select a **Status** of **On** or **Off**. The Externally Initiated Cal will begin when the **Start Pattern** is met.

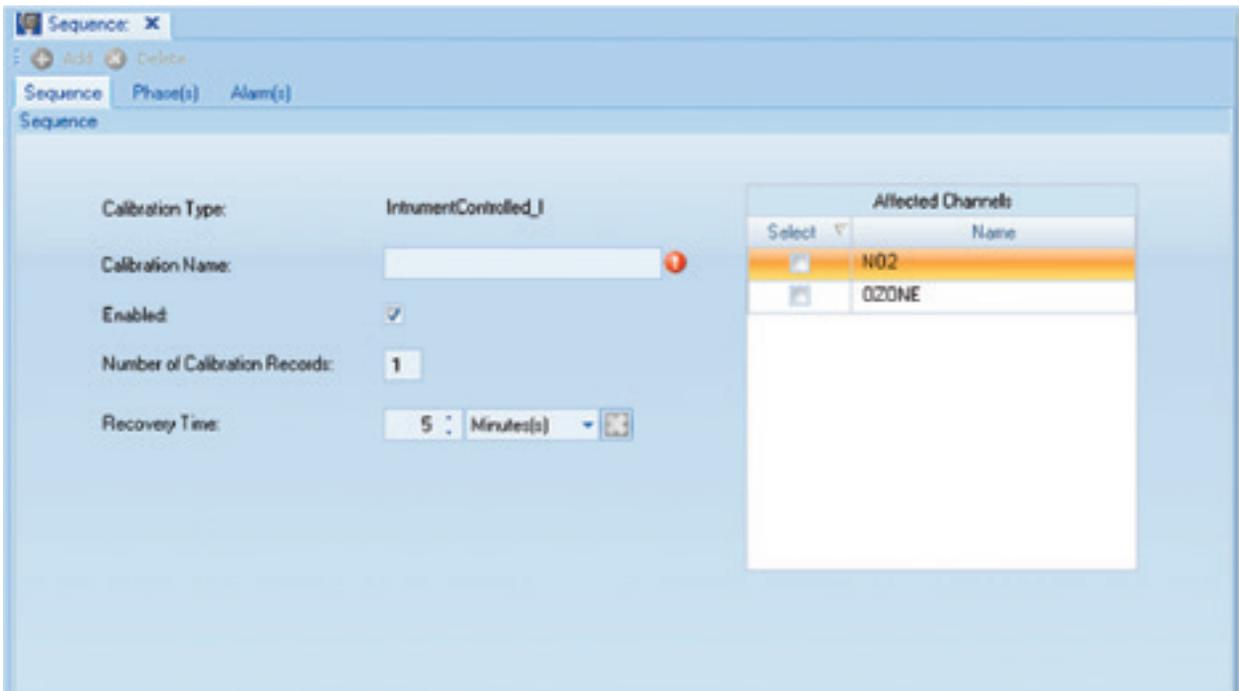


Configuring Start Pattern (Line Status Pattern) in Externally Initiated Calibrations in Configuration Editors > Logger Channels

## Configuring Instrument Controlled Calibrations

If you configure **Instrument Controlled** Calibrations, enabled calibrations will be initiated by the data logger when it detects a specified digital input pattern. Each phase will continue until the input line pattern changes. The Instrument Controlled Cal screen has the following fields:

- ◆ **Calibration Type** will be already filled in (InstrumentControlled\_I).
- ◆ **Calibration Name** is required to identify the cal program.
- ◆ Check **Enabled** if the calibration is to run.
- ◆ **Number of Calibration Records** determines how many cals the data logger will store before overwriting.
- ◆ **Recovery Time** specifies the time required to purge cal gas after phases
- ◆ **Affected Channels** determines which channels will be taken off-line during cal. Select from a list of previously configured parameters.



Configuring Instrument Controlled Calibrations from Configuration Editors > Logger Channels

## Configuring User-Initiated Calibrations

User-initiated calibrations are started manually by linking to the data logger. When the cal sequence is started, each phase will be initiated in order. The duration of each phase is configured with the same fields as automatic cal.

The User-Initiated Cal configuration screen has the following fields :

- ◆ **Calibration Type** will be already filled in (UserInitiated\_U).
- ◆ **Calibration Name** is required to identify the cal program.
- ◆ Check **Enabled** if the calibration is to run.
- ◆ **Number of Calibration Records** determines how many cals the data logger will store before overwriting.
- ◆ **Recovery Time** specifies the time required to purge cal gas after phases.
- ◆ **Affected Channels** determines which channels will be taken off-line during cal. Select from a list of previously configured parameters.

The screenshot shows a configuration window for a calibration sequence. The 'Calibration Type' is set to 'UserInitiated\_U'. The 'Calibration Name' field is empty and has a red error indicator. The 'Enabled' checkbox is checked. The 'Number of Calibration Records' is set to 1. The 'Recovery Time' is set to 5 minutes. A table titled 'Affected Channels' is visible, with columns 'Select' and 'Name'. The table contains two rows: 'NO2' and 'OZONE', both with checkboxes in the 'Select' column.

Select	Name
<input type="checkbox"/>	NO2
<input type="checkbox"/>	OZONE

Configuring User-Initiated Calibrations

## 2.6 Configuring Digital Events

### Digital Event Programs

The Digital Event feature allows the user to specify a digital control output event. A digital event program can be either timed or triggered by a digital input.

For example, a digital event program could be described as: Starting at 7:30 PM on July 6, turn digital outputs 13 and 14 on, leave them on for 75 minutes, and repeat this sequence every third day.

For a timed digital event program, the start time and repeat interval for the digital output(s) event are specified, much like an automatic calibration. Other definitions include:

- ◆ **Output Control Line(s)**

The list of the relay outputs that should be activated at the start time.

- ◆ **Output Duration**

The length of time that the Output Control Line(s) will be activated. After the Output Duration, the lines will return to their inactive state. 5s to 999 s, m, h, or d (for seconds, minutes, hours, or days, respectively).

- ◆ **Disable During Calibration(s)**

The list of calibration program names during which the digital program will update its Starting Time but will not activate output lines. This option allows calibrations to override normally programmed sequence.

- ◆ **Serial Port, Output String (Triggered GSI)**

When the sequence is triggered, the designated string will be sent out the serial port

For Digitally Triggered digital event programs, a digital input pattern is specified that will initiate the digital output(s) event (much like an Instrument Initiated Calibration). The output lines will remain on in their active state for the specified duration. At the end of this time, the output lines will be deactivated unless the triggering digital input pattern is still true.

## Configuring Input/Output Lines for Digital Events

The purpose of digital event programs is to control processes via relay outputs on the Model 8872. **Digitally Timed Events** will turn on specified **Output Lines** for the configured **Starting Time**, **Duration**, and **Repeat Interval**. **Digitally Triggered Events** are initiated by a digital input pattern that will turn on one or more digital output lines. The output lines will remain active for the specified duration; at the end of this time, the output lines will be turned off unless the triggering digital input pattern still matches.

### Configuring Digital Timed Events

1. Highlight the **Data Logger** in **Configuration Editors > Logger Channels** tree menu.
2. Click the green **Add** button in the ribbon and select **Add Digital Events > Timed Event**.
3. Enter a **Digital Event Program Name**, a **Starting Time**, **Output Durations**, **Repeat Interval**, and check **Enabled**.
4. If the Digitally Timed Even is for a calibration, select a **Calibration Name** from the drop-down list.
5. Click the **Output Lines** button to bring up the **Line Status Pattern** screen and select a **Line Number**. Click **OK**.

Sequence:NOX\_ZS Timed Event: X

Digital Event Details

Digital Event Program Name: HIGHVOL

Starting Time: 11/13/2011 00:00:00

Output Duration: 1 Day(s)

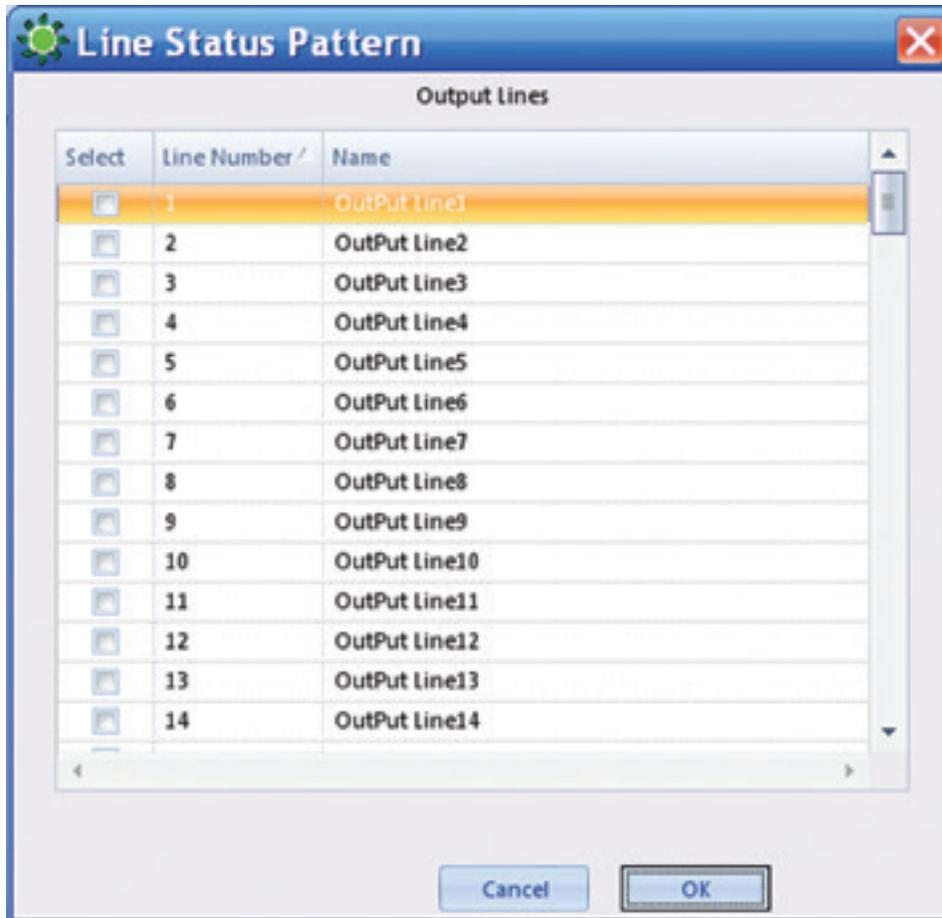
Repeat Interval: 6 Day(s)

Select	Calibration Name
<input checked="" type="checkbox"/>	NOX_ZS
<input type="checkbox"/>	MULTIPNT
<input type="checkbox"/>	NOX_ZPS

Enabled

Output Lines

Timed Digital Event

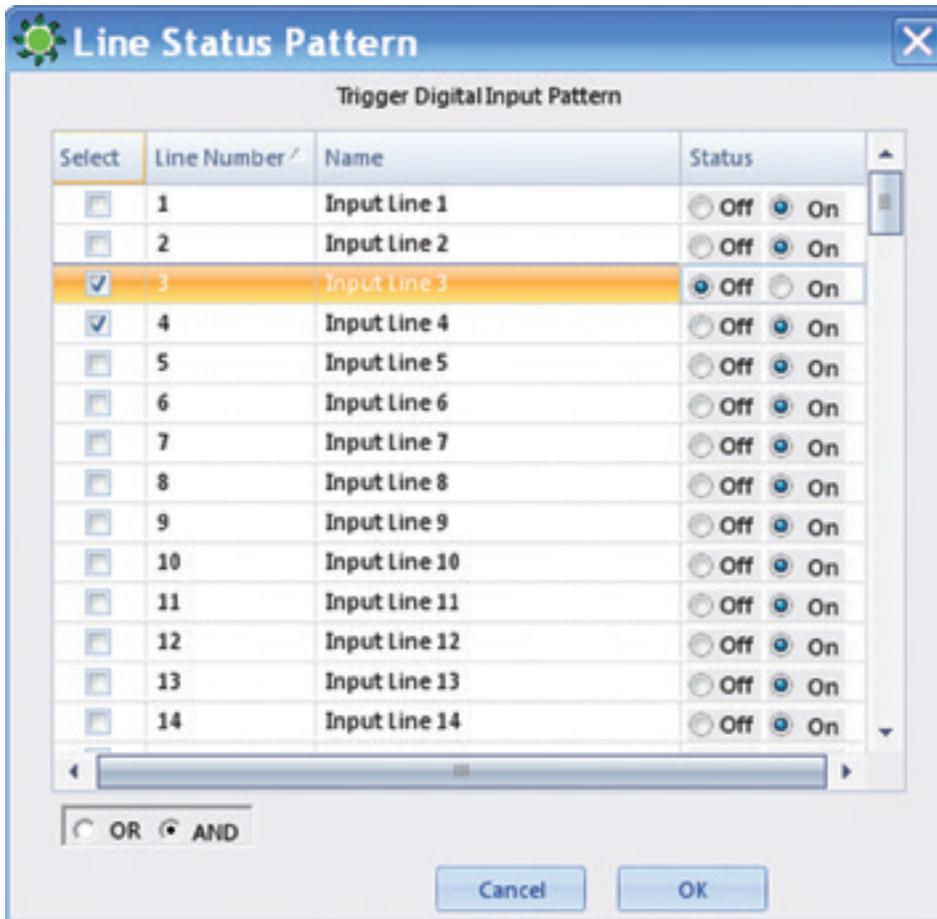


Line Status Pattern for Output Lines

### Configuring Digital Triggered Events

1. Highlight the **Data Logger** in **Configuration Editors > Logger Channels** tree menu.
2. Click the green **Add** button in the ribbon and select **Add Digital Events > Triggered Event..**
3. Enter a Triggered **Digital Event Program Name**, an **Output Duration** and check **Enabled**.  
After the output duration time period, the program will check the digital input pattern to see if it still matches. If not, the output control lines will be switched off. If the pattern still matches, the output relays will remain on, and the duration time will begin again.
4. If the Digitally Triggered Event is for a calibration, select a **Calibration Name** from the drop-down list.
5. Click the **Output Lines** button to bring up the output **Line Status Pattern** screen and select which **Output Line or Lines** will be switched on when the triggered digital input pattern occurs. Click **OK..**

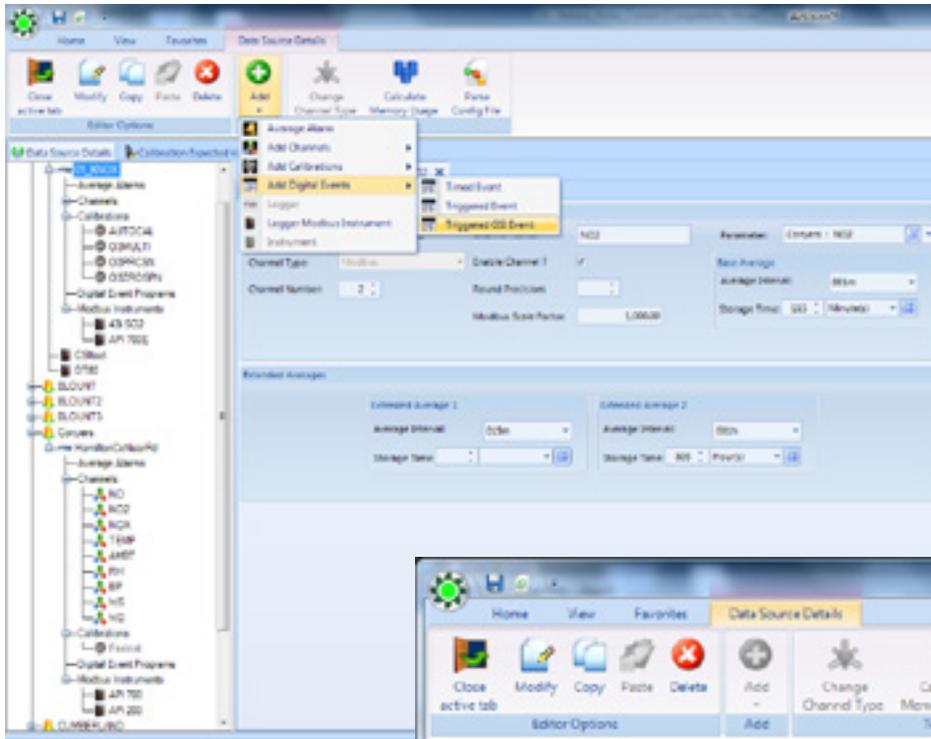
6. Click the **Trigger Digital Event Pattern** button to bring up the **Line Status Pattern** screen for Trigger Digital Input Pattern and select which **Input Line**.or **Lines** turned **On** or **Off** will trigger the event and switch on the specified **Output Line(s)**..
7. In the lower left corner of the screen, select **And** or **Or**. If you select **And** (the default), the digital event program will be triggered **only if ALL** the specified conditions occur. If you select **Or**, the digital event program will be triggered if **ANY** of the specified conditions occur. Click **OK**.



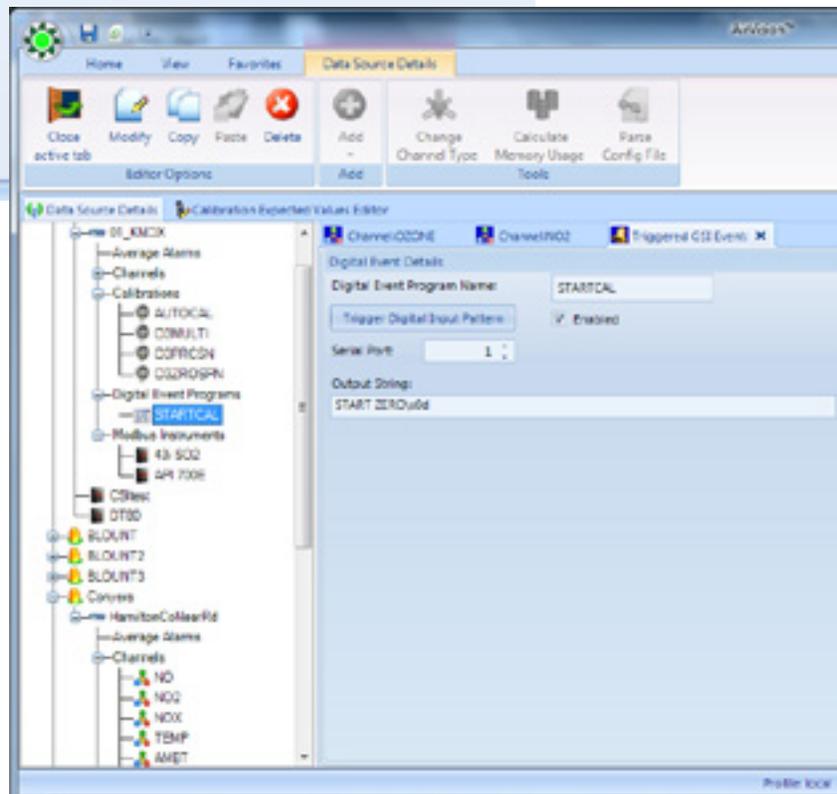
Trigger Digital Input Line Status Pattern with OR/AND selection

### Configuring DI-Triggered GSI Events

These events are used to send GSI strings based on the transition of a digital input (or of a pseudo DI-DO pair in the logger). Commonly, these are used to control RS-232 based calibrators or other devices. For this device, a digital input pattern is defined. When the logger sees the digital input transition to match this pattern, the GSI string is sent out the designated serial port (just once). The string is not resent until the logger goes to a non-matching input state, and then back to the matching state.



Triggered GSI Event



Digital Event details

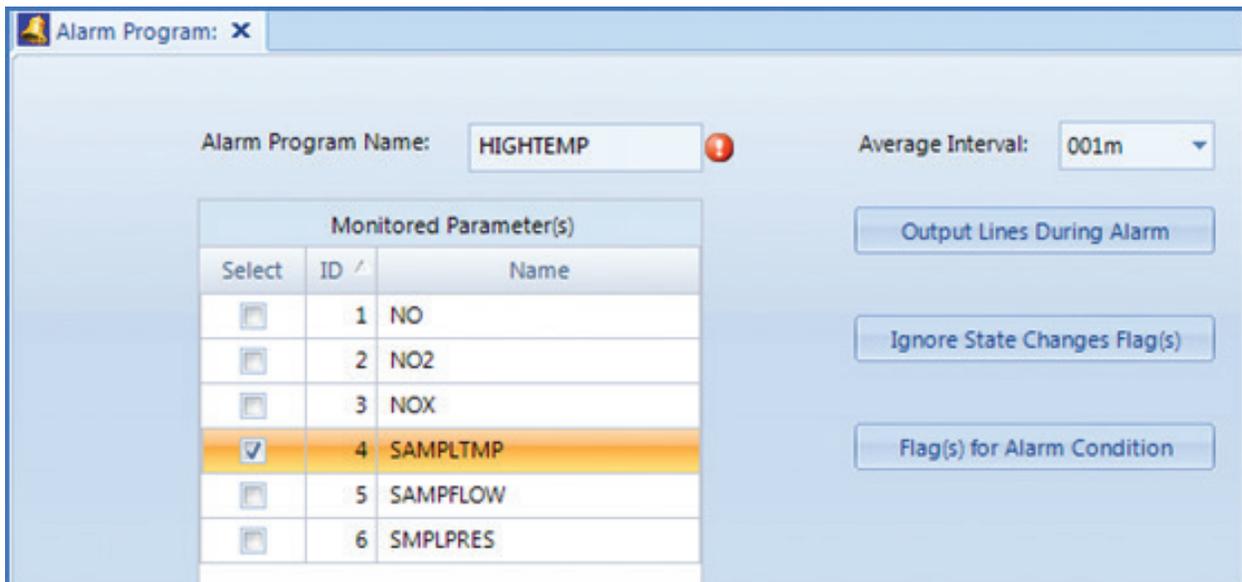
## 2.7 Average Alarms

### Average and Calibration Alarms

Although AirVision and the 8872 component contains an alarm checking system, these programs are used primarily to send e-mail notifications. In some cases, it may be necessary to activate a physical relay or switch a Modbus digital point based on a calibration result. For these actions, the Model 8872 supports the same local logger alarm programs as the Model 8816 / 8832 data loggers.

### Logger Average Alarms

Logger Average Alarms are set in the Logger Channels screen, using **Add > Average Alarm**. In the same manner as the AirVision/ 8872 alarms, the user designates the parameter(s) to be observed, the average interval, the triggering flag(s), and potentially a list of flags that might inhibit the alarm condition (e.g., maintenance, calibration). The only addition is that the user can set the **Output Lines During Alarm** (similar to setting relay outputs for a calibration). These relays will be turned on during the alarm condition, and remain set until the alarm condition goes away.



Alarm Program configuration

## Calibration Alarms

Calibration alarms are set as part of the calibration configuration, using the **Alarms** tab and the **Add > Alarm** button. The user would designate:

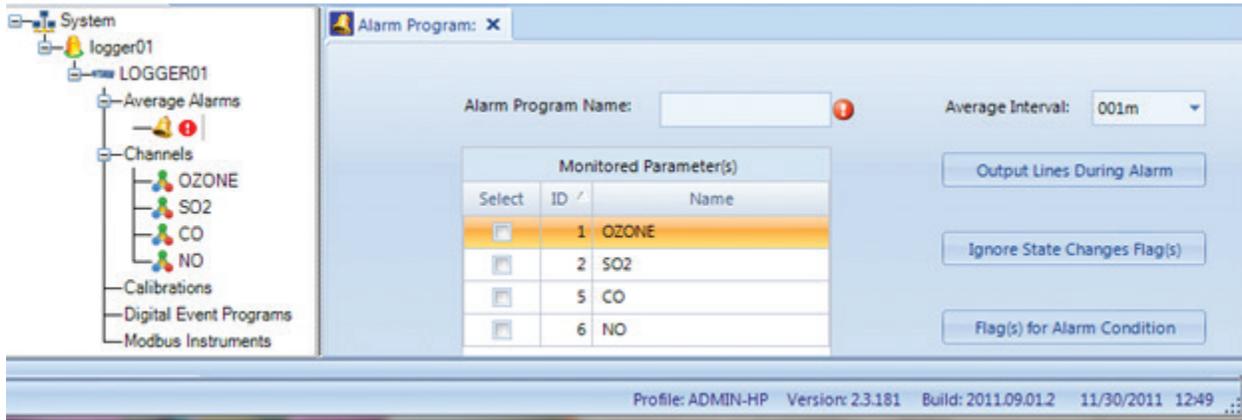
Sequence	Phase(s)	Alarm(s)								
Alarms										
Alarm Name	Enabled	Alarm On Cal Drift	Alarm On Cal Aborted	Alarm On Autoscale Failure	Output To Alarm Port	End Alarm On No Flag	Ack Timeout Interval	Alarm Output Lines	Alarm Input Lines	Monitored Parameters
DRIFT	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0005	Select Output Line	Select Input Lines	Monitored Parameters

### Calibration Alarm configuration

- ◆ **Alarm Name**  
The name to distinguish different cal alarm programs.
- ◆ **Enabled**  
Allows the alarm to be temporarily disabled.
- ◆ **Alarm On Cal Drift**  
If set, the alarm will be triggered if any of the Monitored Parameters are found to have a difference between measured value/result and Expected Value to be greater than the drift limit for that channel / phase.
- ◆ **Alarm On Cal Aborted**  
If set, the alarm will be triggered if the calibration sequence is aborted before it complete.
- ◆ **Alarm On Autoscale Failure**  
If set, the alarm will be triggered if “EV for Auto Correct” is set, but the data logger cannot mathematically calculate a rescaling adjustment.
- ◆ **Output to Alarm Port**  
Not used in the Model 8872.
- ◆ **End Alarm on No Flag**  
Not used in the Model 8872.
- ◆ **Ack (Acknowledge) Timeout Interval**  
Not used in the Model 8872.
- ◆ **Alarm Output Lines**  
Used to define which relays / Modbus outputs are to be turned on when the alarm condition is found.
- ◆ **Alarm Input Lines**  
Not used in the Model 8872.
- ◆ **Monitored Parameters**  
Used to set the list of calibration parameters that are observed for calibration purposes (may be a subset of the total list of calibrated parameters).

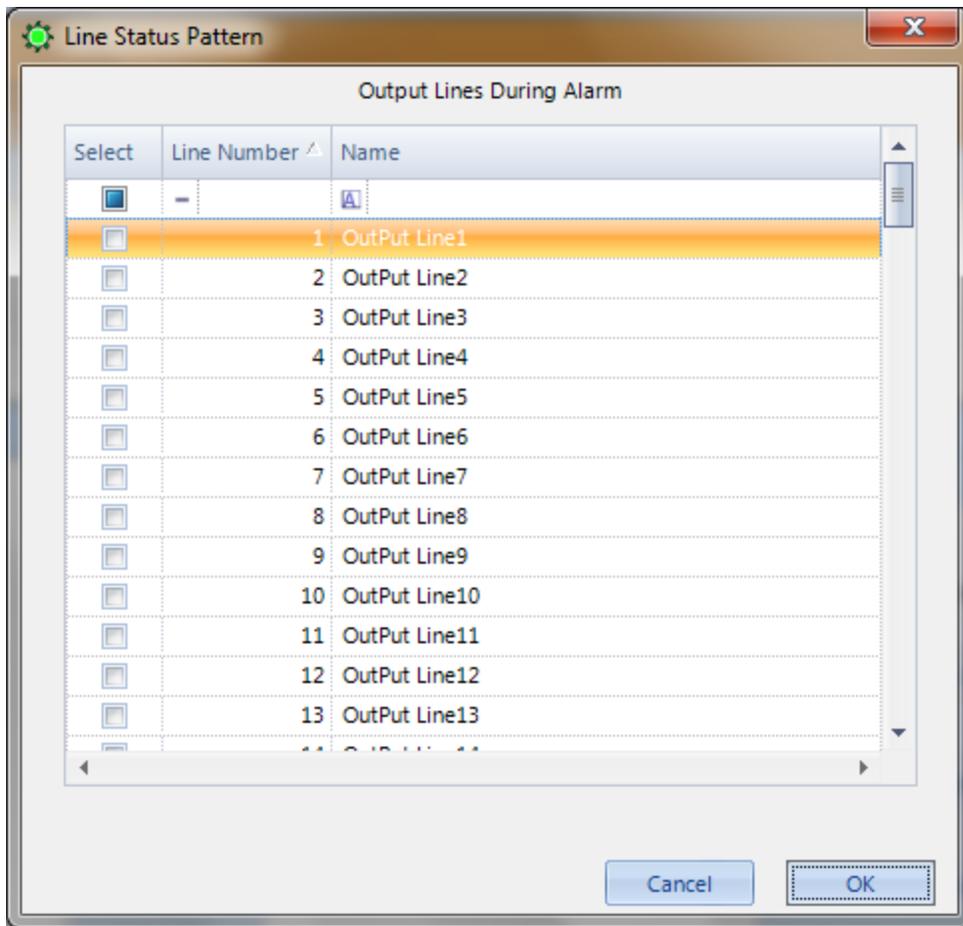
## Average Alarms

Average Alarms are configured the same way as Cals and Digital Events, by selecting **Configuration Editors > Logger Channels** and highlighting the logger in the Logger Channels tree, then selecting **Add > Average Alarm** from the drop-down list. You will see the following screens:



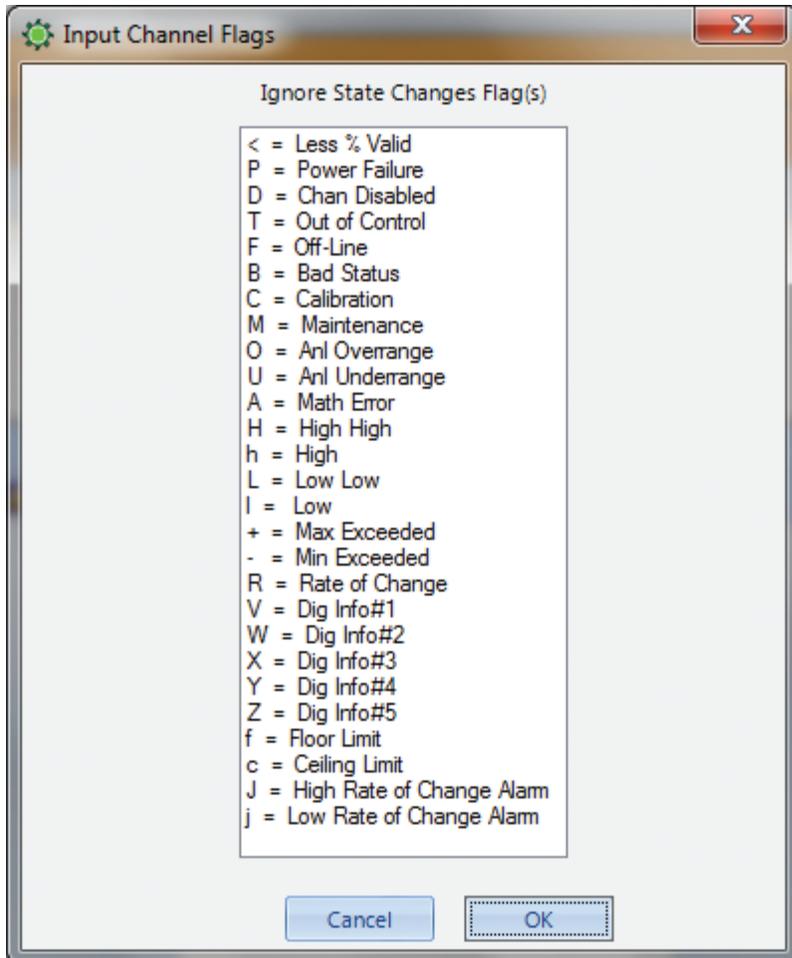
Average Alarm Configuration (Configuration Editors > Add Average Alarm)

Select a Monitored Parameter (or Parameters), then click Output Lines During Alarm, Ignore State Changes Flags, or Flags for Alarm Condition.



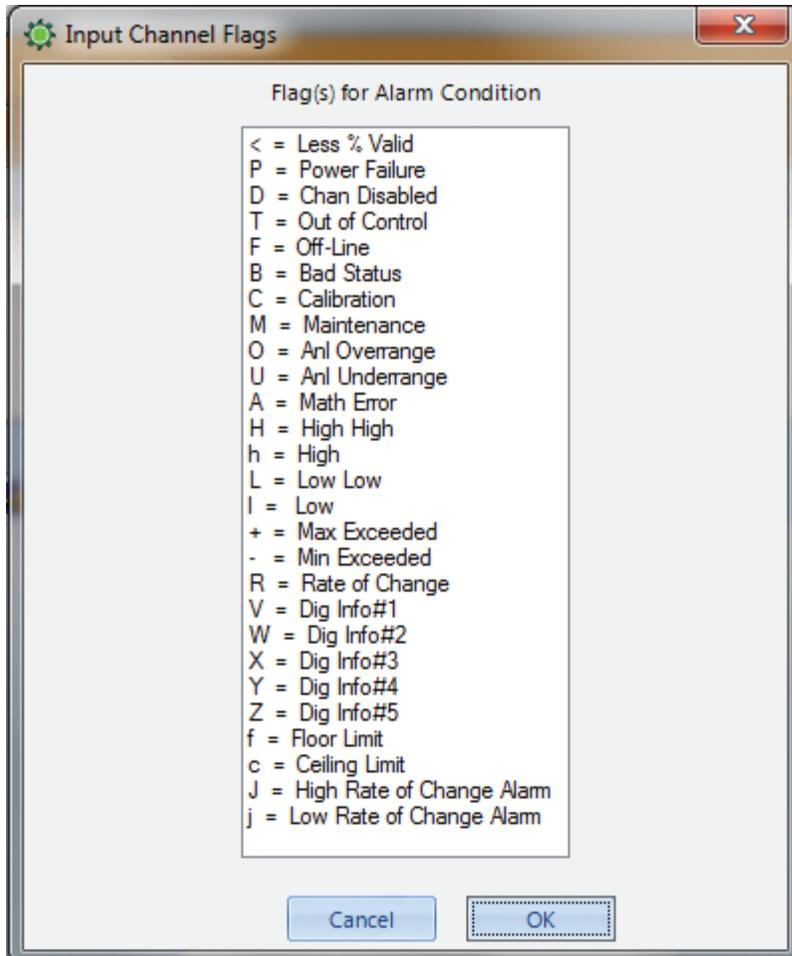
Output Alarms During Alarms--Line Status Pattern

If you selected **Output Lines During Alarm** click in the box to check the **Output Lines** that will trigger the alarm, then click **OK**.



Input Channel Flags > Ignore State Changes Flags

If you selected Ignore State Changes Flags, highlight the Input Channel Flags to Ignore during State Changes, then click OK.



Input Channel Flags > Flags for Alarm Condition

If you selected Flags for Alarm Condition, highlight which Input Channel Flags will trigger an Alarm Condition, then click OK.

Click the Save icon on the ribbon.

This section describes the **Data Rollup Processor**, which allows shorter term averages to be rolled up into larger block or rolling averages, if enabled.

## 2.8 Data Rollup Processor

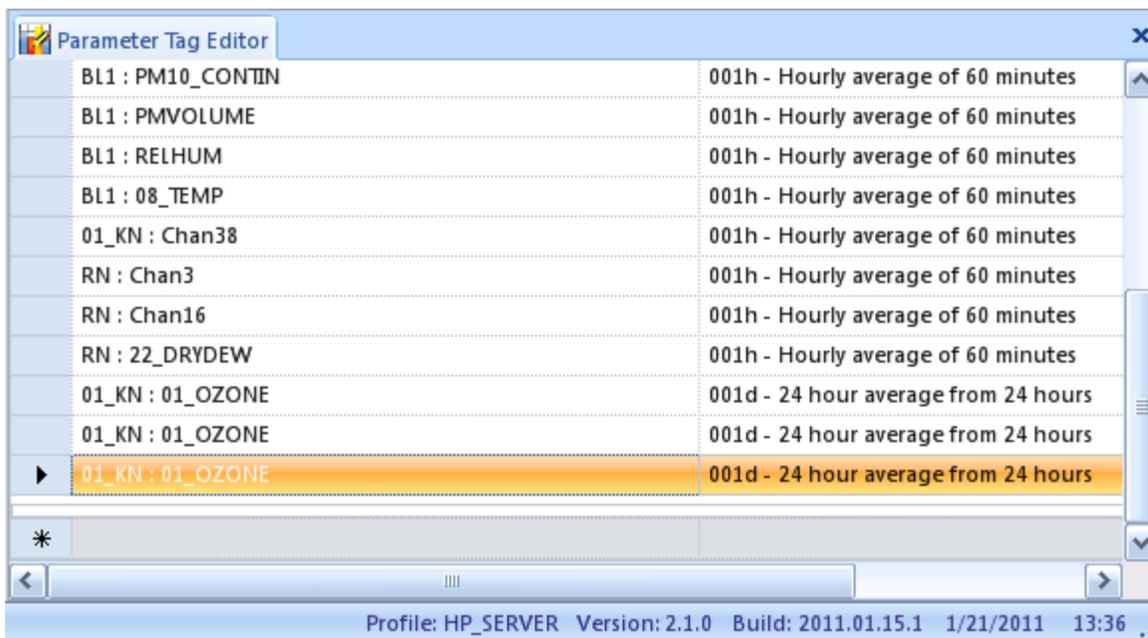
The Data Rollup Processor is an optional module, usually included as part of an Instrument Polling license. The Data Rollup Processor allows shorter-term averages to be rolled up into larger block or rolling averages. Examples of this would include:

- Re-creating hourly data from 1-minute data
- Rolling up 5-minute or other odd intervals from a directly polled instrument to hourly data
- Rolling up hourly averages to daily averages
- Creating a new parameter with an 8-hour rolling average (e.g., ozone) calculated within the 8872.

The calculation can be done both manually (**Utilities->Manual Average Data Rollup**) or it can be scheduled in **Configuration Editors>Task Scheduler**.

Before doing the calculation, set up the rollup programs and tie them to specific **Parameter Tags**. A **Tag** is a term for a combination of a parameter and an average interval (e.g., hourly ozone, 1-minute CO). The intervals are specific to the frequency at which data is inserted into the database, so the system can't distinguish between OZONE:1h that comes from a block average of minute data and OZONE:1h that is an 8-hour rolling average, updated on the hour. For rolling averages, create a new parameter in the Site/Parameter editor to store the rolling average data.

If you need to create new tags (e.g., create an daily average tag, or create the 1-hour tag for your new OZONE\_8HR parameter), open **List Editors->Parameter Tag Editor**.



Create new tags in List Editors>Parameter Tag Editor

Once all the tags you need exist, use the **Configuration->Average Tag Rollup Editor** to create your new rollup programs:

Rollup Method	Input Tag	Output Tag
Hour to Daily	01_KN : 01_OZONE : 001m	01_KN : 01_OZONE : 001d
Hourly to 8-Hour Rolling	01_KN : 01_OZONE : 001h	01_KN : 01_OZONE : 001h
*		

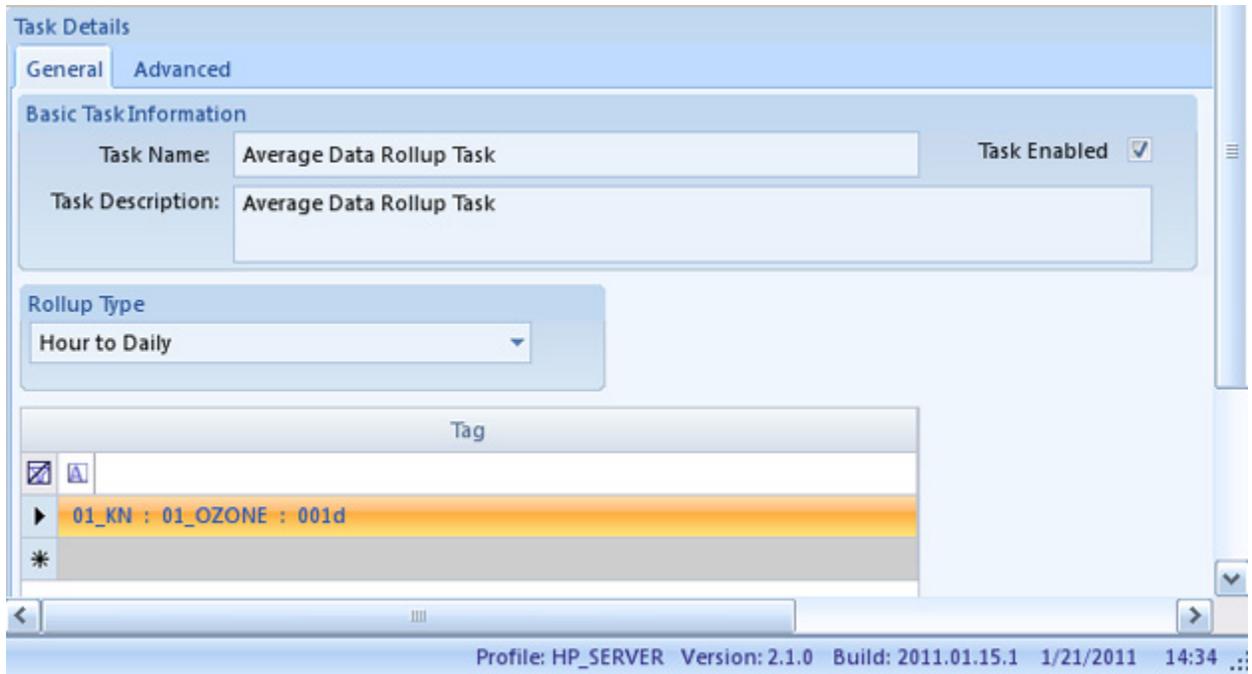
Utilities>Manual Average Data Rollup

To run a program manually, go to **Utilities>Manual Average Data Rollup**, select the Rollup Type, Date Range, and Parameter Tag Selection. Click the Process Rollup button.

Site Name	Site Enabled	Parameter Name	Parameter Enabled	Time Interval
01_KN	<input checked="" type="checkbox"/>	01_OZONE	<input checked="" type="checkbox"/>	001d

To run a program manually, Utilities>Manual Average Data Rollup

To run a Rollup Task automatically, create a new Average RollupTask in **Configuration Editors>Task Scheduler>Average Rollup Task**, and select an Average Data Rollup Task. Then select the specific Task Type, Start Time, Repeat Interval, and Task Description.



Automatic Rollup Task in Configuration Editors>Task Scheduler>Add Average Rollup Task

## 2.9 Scheduling Tasks

Some automatic actions in the 8872 are managed by the **Task Scheduler**, which runs as part of the background AirVision service. The Task Scheduler has three user interfaces:

- ◆ **Task Scheduler (Configuration Editors > Task Scheduler)** allows you to add, review, and edit individual and grouped task events.
- ◆ **Task Wizard (Configuration Editors > Task Scheduler > Run Schedule Wizard** button in ribbon at top of screen) allows you to create grouped polling events as well as events triggered by polling.
- ▶ **Note:** This Wizard is ONLY used for setting a Model 8872 to poll another device, like an instrument or another Model 8816 / 8832 data logger. It is not related to another server polling the 8872 itself.
- ◆ **Task Display (Utilities > Scheduled Task Status)** is a constantly updating display of all tasks within the system, including the last time run, next execution time, and errors experienced during the last run.

The following tasks can be configured in the Task Scheduler, depending on your licensed options:

- ◆ Alarm Processing Task
- ◆ Average Data Purge Task
- ◆ Average Rollup Task
- ◆ Fill Average Data Gaps Task
- ◆ Instrument Poll Task
- ◆ Journal Message Purge Task
- ◆ Logger Poll Task
- ◆ Scheduled Command Line Task
- ◆ Scheduled Report Task
- ◆ SQL Execution Task
- ◆ New Task Group

Usually, for the 8872, the only tasks used are purge/archive tasks, and perhaps instrument polling and alarm tasks.

## Task Scheduler

The Task Scheduler screen has three sections:

- ◆ **Task Schedule** displays all scheduled tasks and cannot be edited.
- ◆ **Task Schedule Details** section is where you select an **Executive**, and **Start Time**, and a **Repeat Interval**. **Enabled** must be checked in this section before you can select **Enabled** in the **Scheduled Task Selection** section.
- ◆ An **Advanced** tab is provided next to the repeat interval to allow the user to specify if the task is only to run on certain days of the week, or only in a 'window' of certain hours of the day This is especially useful for polling tasks.

**Schedule Details**

**Task Information**

Task Name: Average Data Purge Task  Enabled

Description: Average Data Purge Task

Executive: ZENBOOK

Start Time: 12/06/2012 17:17:20

Repeat Interval: 1 Day(s)

**Days to Run**

Sunday  Monday  Tuesday  Wednesday

Thursday  Friday  Saturday

**Time of Day Restriction**

Unrestricted

Run only between:  and:

OK

Task Scheduler showing a Logger Poll Task (Configuration Editors > Task Scheduler)

To configure an individual task in the **Task Scheduler (Configuration Editors > Task Scheduler)**, click the **Add** button in the ribbon at the top of the screen and select one of the following categories:

- ◆ **Alarm Processing Task** reviews alarm Triggers for matches, creates alerts, and tells the 8872 when to process a particular alarm rule. If you use task groups and designate tasks to run in sequence, you can designate alarms to be processed immediately after a data poll. (Alarm Processing is not used in the 8872.)
- ◆ **Average Data Purge Task** purges or archives old data from the database. Eventually, the 8872 database becomes so big that it takes a long time to back it up, so it is helpful to remove and/or save old data, in particular minute data. You can choose any average interval to be scheduled for Purge or Archive. Purged data will be permanently deleted from the database. Archived data is copied to an external file before purging. Archived data is stored with all flags and annotations and can be re-imported later. The Model 8872 uses specialized data keys so sites and channels can be renamed or renumbered and archived data can still be correctly imported. Select the age of the data to purge: **Purge Data Older Than** a specified number of seconds, minutes, hours, days, weeks, or years. We recommend purging 1-minute data older than 1 year to keep the database within allowable size.
- ▶ **Note:** Average Data can be purged manually via the **Utilities menu>Purge Average Data**. A checkbox option allows you to **retain data during calibrations**. If selected, any data flagged with the **C** flag will not be purged. This allows you to retain minute data from calibrations (e.g., for use in the Calibration Trend Graph's Response Plot) while still removing old minute data.

General **Advanced**

**Basic Task Information**

Task Name: Average Data Purge Task Task Enabled

Task Description: Average Data Purge Task

---

**Purge Options**

Archive Type: Average Data Purge Data Older than: 3 Year(s)

Archive Data Before Purging Alternate Archive Folder (On Server):

---

**Average Data Purge Options**

Interval to Purge: 001m - Minute average from instantaneous  Retain Readings During Calibrations

**Parameter Selection**

All Parameters Drag a column header here to group by that column.

Selected Parameters

Selected	Site Name	Parameter Name	Parameter Template Name
<input type="checkbox"/>	01_KNOX	01_OZONE	OZONE_PP8
<input type="checkbox"/>	01_KNOX	02_PM25_MC	PM25LC
<input type="checkbox"/>	01_KNOX	03_PM25BRAW	
<input type="checkbox"/>	01_KNOX	04_PM25RRAW	

Purge or archive data in Configuration Editors > Task Scheduler

- ◆ **Fill Average Data Gaps Task** repopulates Average Data Records to make them continuous where data is missing. This task inserts top of the day blank records in the database to improve reporting and data query performance. Filling average data gaps is critical for optimizing the performance of 8872 reporting, and should be configured to run every day after midnight in every system. Each system needs only one of these tasks. The screen defaults to a repeat interval of one day and a time to run of 00:00:00 (midnight).
- ◆ **Journal Message Purge Task** removes Event Log journal messages (internal error logs) that are older than a specified age in seconds, minutes, hours, days, weeks, or years. The purge occurs at a specified **Repeat Interval**. An option is available to **Archive Data Before Purging**. Agilaire recommends purging entries older than 2 weeks.
- ◆ **Logger Poll Task** would only be used if the 8872 is used in conjunction with an existing 8816/8832.
- ◆ **Scheduled Command Line Task** allows you to automatically execute any DOS command line, such as a batch file or .exe file (e.g., NTbackup.exe).

- ◆ Scheduled Report Task automatically sends scheduled reports to a designated printer, emails reports to configured recipients, or saves them to a file.
  - ◆ Click the green Add button and select Scheduled Report Task.
  - ◆ In the Task Schedule Details section, select Executive, Start Time, and Repeat Interval.
  - ◆ In the Task Details section, enter a Task Name and enter an optional Task Description, and click to select Enabled.
  - ◆ In the Report Task Options section, select a Report from the drop-down list.

Click the Configure Report Query button to select Date Range, Average Interval, and Parameter(s). The Query String will be displayed near the bottom of the screen. Click OK to save the configuration.
  - ◆ In the Output Options section, click the Printing Options tab if the report will be printed. Select Enable Printing and designate the Printer Path.
  - ◆ If the report will be emailed, select the Notifications Options tab, check Enable Notifications, and enter a Notification Publication Description. (Users and/or User Groups must be designated in **Configuration Editors > Security** before Notifications will be sent.)
  - ◆ If the report will be saved to a file, open the File Output Options tab and select an Output File Type (comma separated, Excel, image, text, HTML, PDF, or rich text) from the drop-down list. This option can be used to write the scheduled report to a local or network drive, and/or to FTP the file to a particular FTP server.

Enter a File Output Base Name. (Windows does not allow “/” or “:” characters in file names.)

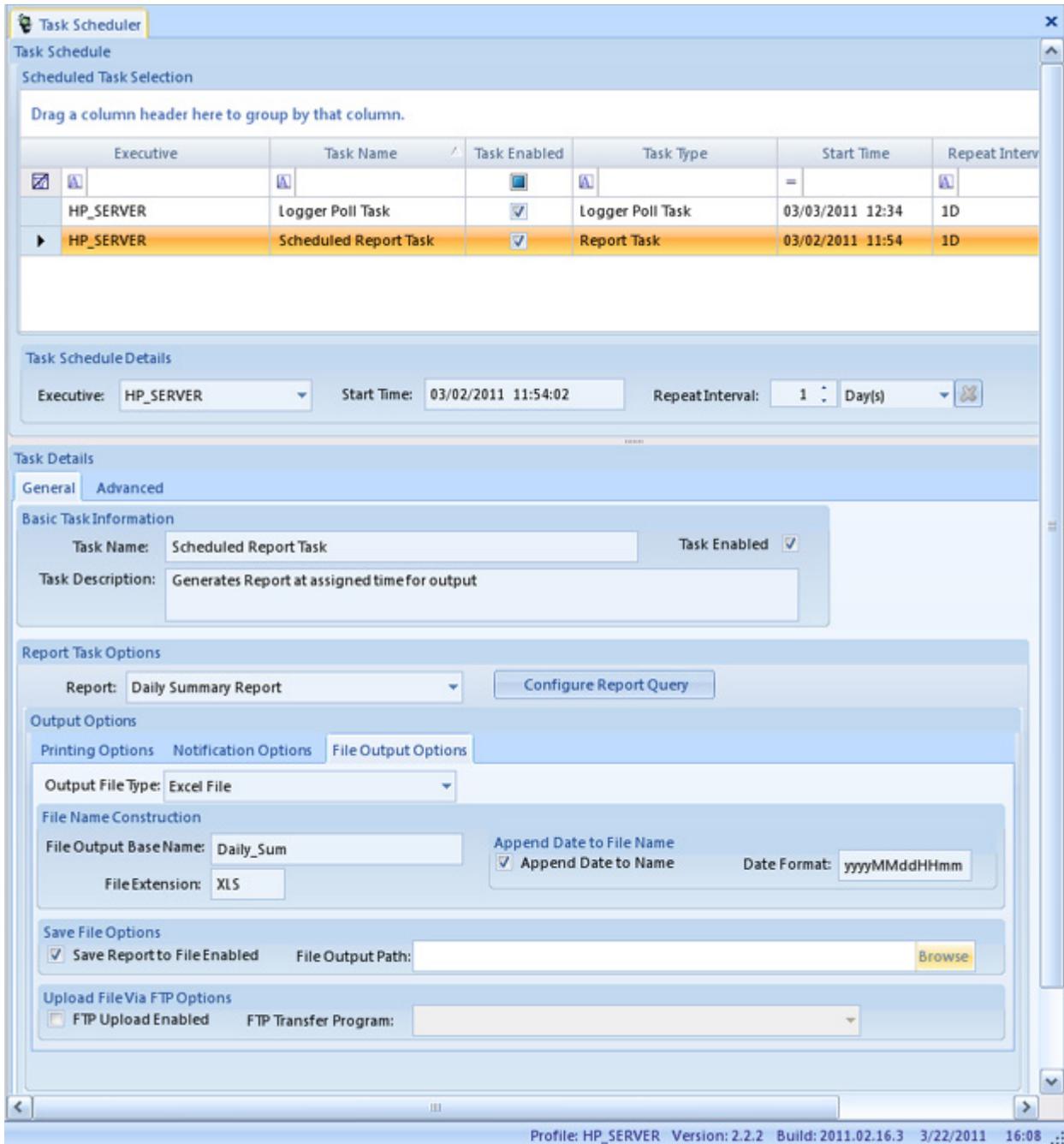
The File Extension will be filled in automatically from the Output File Type selected.

To have the scheduled task append the current date/time to the file name, select Append Date to Name and a Date Format, for example, Daily\_Sum201106271900. Selecting this option ensures that new files do not overwrite existing files in the directory. If this option not selected, the task will overwrite the file each time the task runs.

To Save the file, check Save Report to File Enabled and browse to a File Output Path.

To Upload File Via FTP Options, select FTP Upload Enabled and select an FTP Transfer Program from the drop-down list of configured FTP programs.

Click the Save icon on the Ribbon to save the task.



Schedule Report Task (Configuration Editors > Task Scheduler > Add Scheduled Report Task)

- ◆ **SQL Execution Task:** This task is most commonly used to schedule backups to local disk or USB drives.
  - ◆ To add a SQL Execution Task, click the green Add button on the ribbon and select SQL Execution Task.
  - ◆ Select the Executive, Start Time, and Repeat Interval.
  - ◆ Name the SQL task or use the default name.
  - ◆ Enter the SQL Command Text.
  - ◆ Click the Save button.

- ◆ **New Task Group**

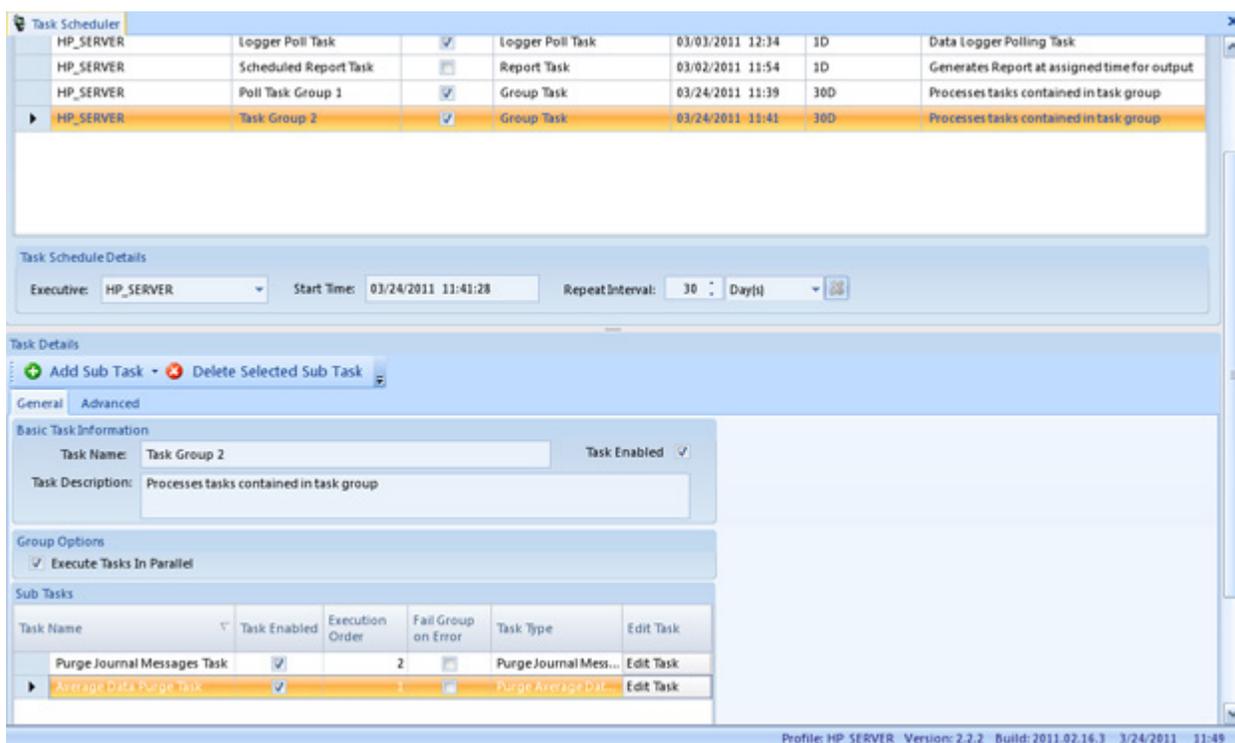
Task Groups allow multiple tasks to be grouped together in one polling process instead of multiple individual tasks. A Task Group consists of Sub Tasks. Tasks can be defined to run groups in parallel, sequentially, or as sub tasks of other task groups to allow mixing of parallel and sequential operations.

- ◆ To create a Task Group, click the green Add button on the Ribbon in the Task Scheduler and select New Task Group.
- ◆ In the Task Schedule Details section of the Task Scheduler, select an Executive, Start Time, and Repeat Interval.
- ◆ In the Task Details section of the screen, enter a Task Name. The Task Description will be filled in automatically, but it can be modified.
- ◆ Check Enabled if you want the Task Group to be activated when you save it.
- ◆ In the Group Options section, check the box if you want to Execute the Tasks in Parallel; otherwise, they will be executed sequentially or as sub tasks of other task groups.

If the sub tasks are to be run sequentially, leave the Execute the Tasks in Parallel box unselected and enter a number in the Execution Order column in the Sub Tasks section.

- ◆ To create the Task Group, add a Sub Task to the Task Group. Click the green Add Sub Task button in the Task Details section and select a task from the drop-down list. (The Sub Task drop-down list has the same options as the Add task button at the top of the Task Scheduler.)
- ◆ When you select a Sub Task from the list, a new screen will pop up for the Sub Task you selected. Fields in the pop-up screen vary according to which sub task is selected.
- ◆ Advanced Options in the pop up screens (not required) allow configuration of Number of Retries and the Interval between Retries.

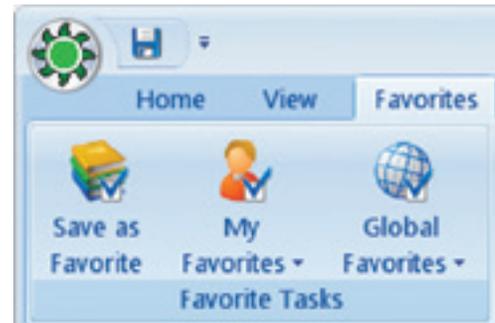
- ◆ When you configure the Sub Task and click OK in the pop-up screen the new Task Name will be added in the Sub Tasks section. The Task Name can be modified.
- ◆ Select the **Fail Group on Error** column in the **Sub Tasks** section if you want the whole Task Group to stop running if an error occurs.
- ◆ **Task Type** in the **Sub Tasks** section indicates the sub tasks that are part of one group task.
- ◆ Click in the **Edit Task** field to make changes in the same pop-up window that came up when the **Add Sub Task** button was clicked.
- ◆ To remove a task from the Task Group select the task in the **Sub Task** section and click the **Delete Selected Sub Task** button.



Task Group (Configuration Editors > Task Scheduler > Add > New Task Group)

## 2.10 Favorites Editor

The Model 8872 simplifies regular tasks with a list of user-defined **Favorites**, which function like Favorites in Internet browsers. Favorites can be created for most menu items, including reports, editors, configurations, journals, calibration functions, security settings, logger functions, emails, and task scheduling. Favorites can be saved for different sites, parameters, average intervals, and date ranges. They can be saved for all users or for one user.

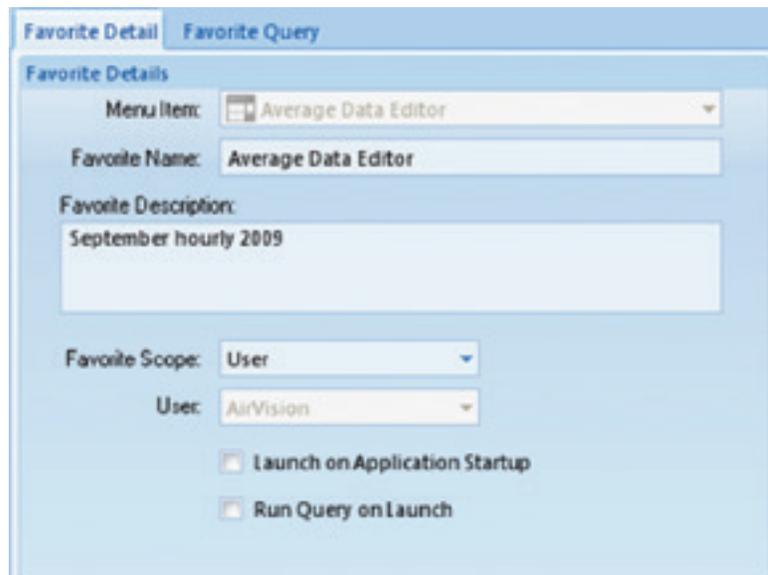


Favorites menu

### Creating a Favorite

To create a favorite, open **Configuration Editors > Favorites Editors**. Click the red **Add Favorite button** on the left side of the ribbon.

- **Note:** Favorites can also be created inside Reports by selecting the **Favorites tab** and clicking the **Save as Favorites icon**.



Add a Favorite screen

### Favorite Detail Tab

Under the **Favorite Detail** tab of the Favorites Editor: select a **Menu Item** from the drop-down list, enter a **Favorite Name**, enter a **Favorite Description** (optional), select a **Favorite Scope** from the drop-down list (**User** or **All Users**) and select from the following options:

- ◆ **Launch on Application Startup** to run the Favorite upon logging in to the 8872
- ◆ **Run Query on Launch** to execute data retrieval when the Favorite is selected.

### Favorite Query Tab

Next, open the **Favorite Query** tab if it is available.

- **Note:** The Favorite Query tab will only be in the Favorites Editor after a Menu Item is selected that requires a time range, interval, and parameter(s), such as the Average Data Report and the Average Data Editor.

Select a **Date Range**, choose an **Average Interval** and select a **Parameter**. To select more than one parameter, drag the arrow in the blue left column or hold down the **Ctrl** key while you select parameters.

To save a favorite when you're in any data editor or report, complete a query, and select **Favorites** from the top menu. The ribbon bar will change to show the favorites menu.

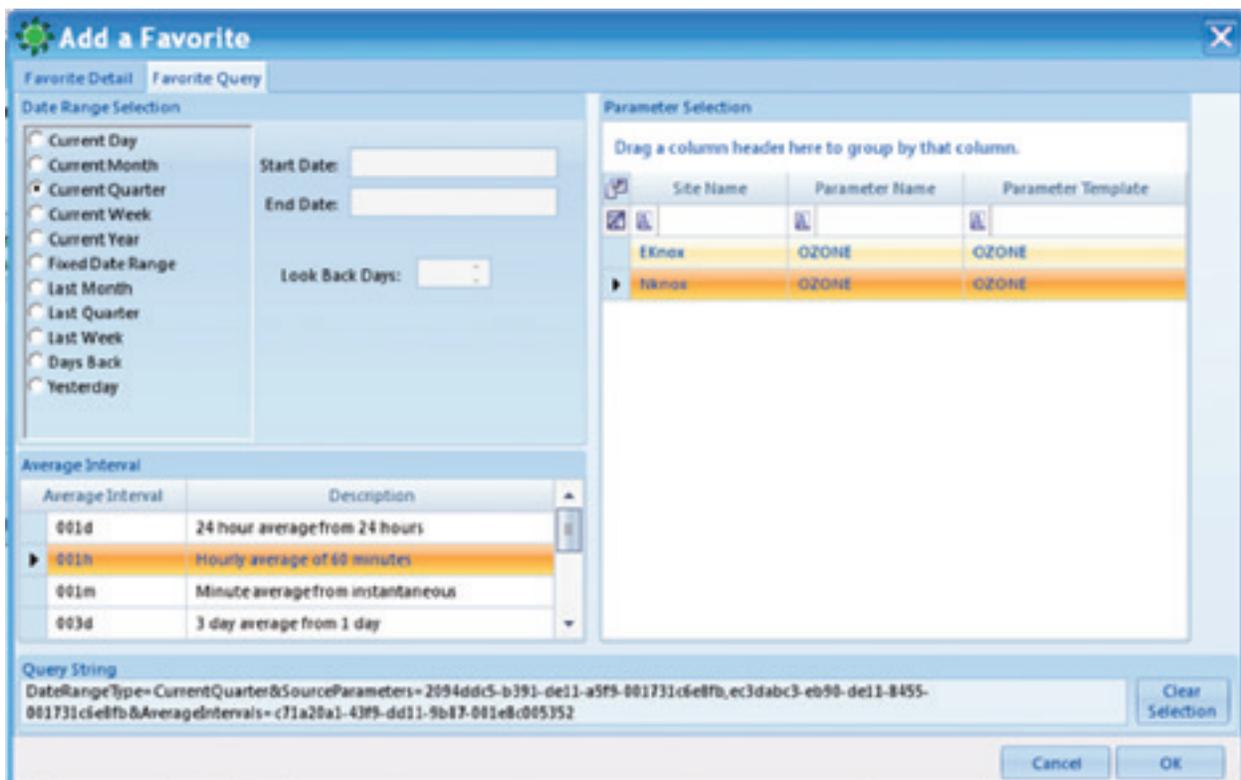
Select **Save as Favorite** to bring up the **Add a Favorite** screen.

You can also configure the **Favorite** by selecting the **Favorite Query** tab after you select **Save as Favorite**. From this screen you can adjust the site/parameter list, date range, or average interval. These values can also be adjusted later in the **Favorites Editor** in the **Configuration menu**.

To return to the ribbon controlling the current application, select the top menu function (above the ribbon), for example, Average Data Editor.

To use an existing Favorite, select **Favorites** from the top menu (above the ribbon bar), select **User Favorite** or **Global Favorites**, and the saved **Favorite**.

A copy button on the ribbon allows you to copy an existing favorite for slight modification, if needed.

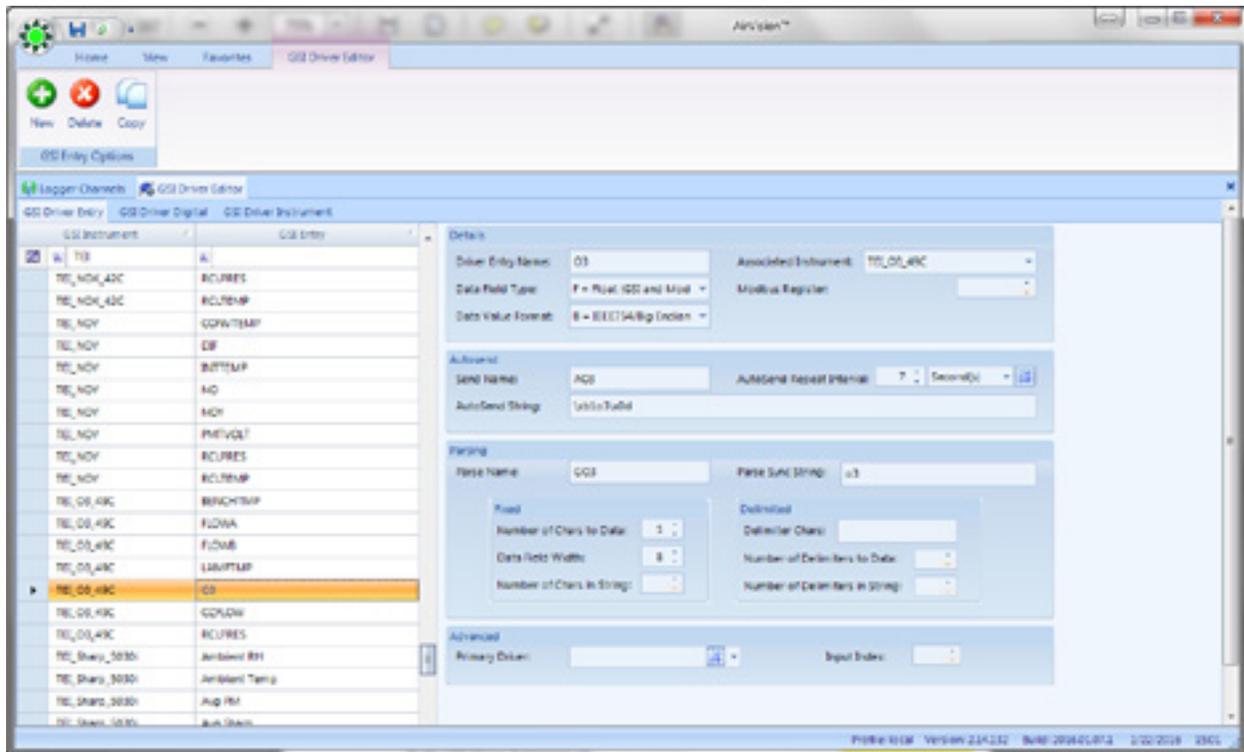


Favorite Query tab from Add a Favorite

### 2.1.1 GSI Driver Editor

The purpose of the GSI Driver Editor (**Editors>GSI Driver Editor**) is to provide a way to add, delete, or modify GSI driver entries in an editor similar to the Parameter Template editor for GSI entries and GSI instruments.

The GSI Driver Editor consists of an alphabetized pick-list of existing GSI entries for modification. Two editors are provided, one for instruments and one for entries, or two sections/tabs of the forms.



Consult the Model 8816/8832 Data Logger Manual for details on the use of these fields.

## 2.12 Configuring Security

User security in the 8872 is set up by administrative personnel and is similar to Microsoft Windows:

- ◆ Each system user has an identity, including a username and password
- ◆ A User may be a member of one or more User Groups
- ◆ Access and rights are assigned to User Groups

User Groups in the 8872 are usually assigned by job responsibility. Users can be members of more than one Group, and each site can have a different access group.

### User Editor

Administrators can add or delete users: open **Configuration Editors > Security > User Editor** and click **Add User** (or **Delete User**) button. Enter an Email address (optional). Click **Save**.

The screenshot shows the 'User Editor' window with the following sections:

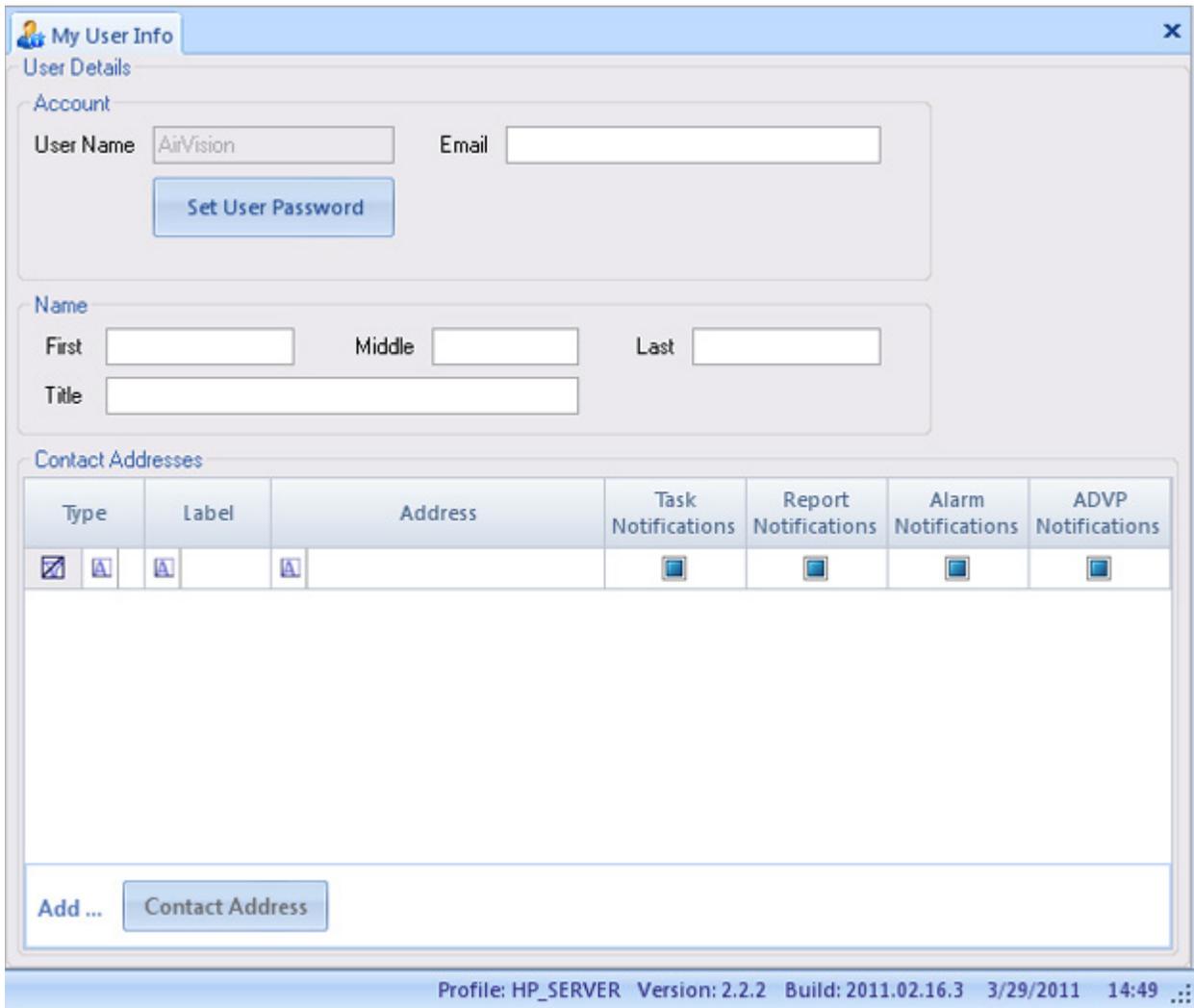
- Users:** A list on the left with 'Admin' selected and 'SiteOperator' below it.
- User Details:**
  - Account:** 'User Name' field contains 'Admin', 'Email' field is empty, and a 'Set User Password' button is below.
  - Name:** 'First', 'Middle', and 'Last' fields are empty, with a 'Title' field below them.
- Contact Addresses:** A table with columns: Type, Label, Address, Task Notifications, Report Notifications, Alarm Notifications, and ADVP Notifications. The first row has checkboxes in the 'Type' and 'Label' columns and blue square icons in the notification columns.
- Bottom:** An 'Add ... Contact Address' button.

User Editor from Configuration Editors > Security > User Editor

### My User Settings

Although the Model 8872 shares the same security model as AirVision, the use of Group Permissions is often not necessary, or relegated only to two access levels (one for full configuration access, one for accessing the displays and reports only).

Non-administrative personnel can change their own Password, Email, and Name, but not their User Name in the **My User Info** screen in **Configuration Editors > Security**. If a User Name needs to be changed (for example, if a name is misspelled), an Administrator would have to delete the original User Name and add a new one.



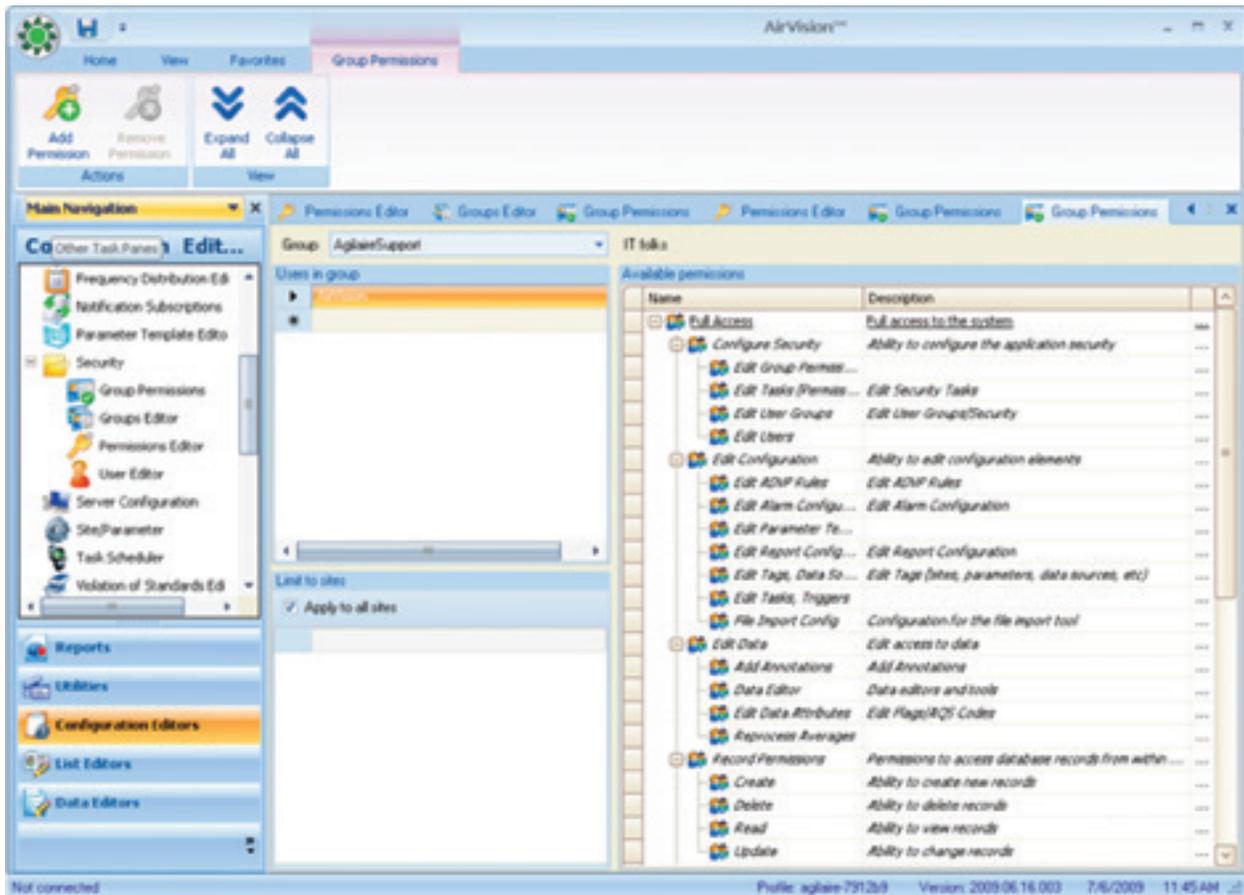
My User iNFO screen in Configuration Editors > Security

## Group Permissions

Finally, define the permissions for each **User Group** using the **Configuration Editors > Security > Group Permissions Editor**. Select a Group in the drop-down list. The list of configured users is displayed (and users can be added here as well). The right panel shows the various rights available in the system, and the status for the current group:

- ◆ Grayed = access disabled
- ◆ Black, underlined = access enabled
- ◆ Black, italic = access enabled by inheriting from another granted access.

In this example, access has been granted to certain Security permissions (Groups, and User Groups, but not Edit Tasks). Access is granted to all configuration items at the topmost level, and all sub-tasks are permitted by inheritance. For example, to turn off Edit ADVP Rules, first remove the overall Edit Configurations permission and then add the individual permissions. Expand and Collapse the tree diagram using the buttons on the ribbon.



Group Permissions from Configuration Editors > Security > Group Permissions Editor

## Chapter 3

# Logger- Central Communications

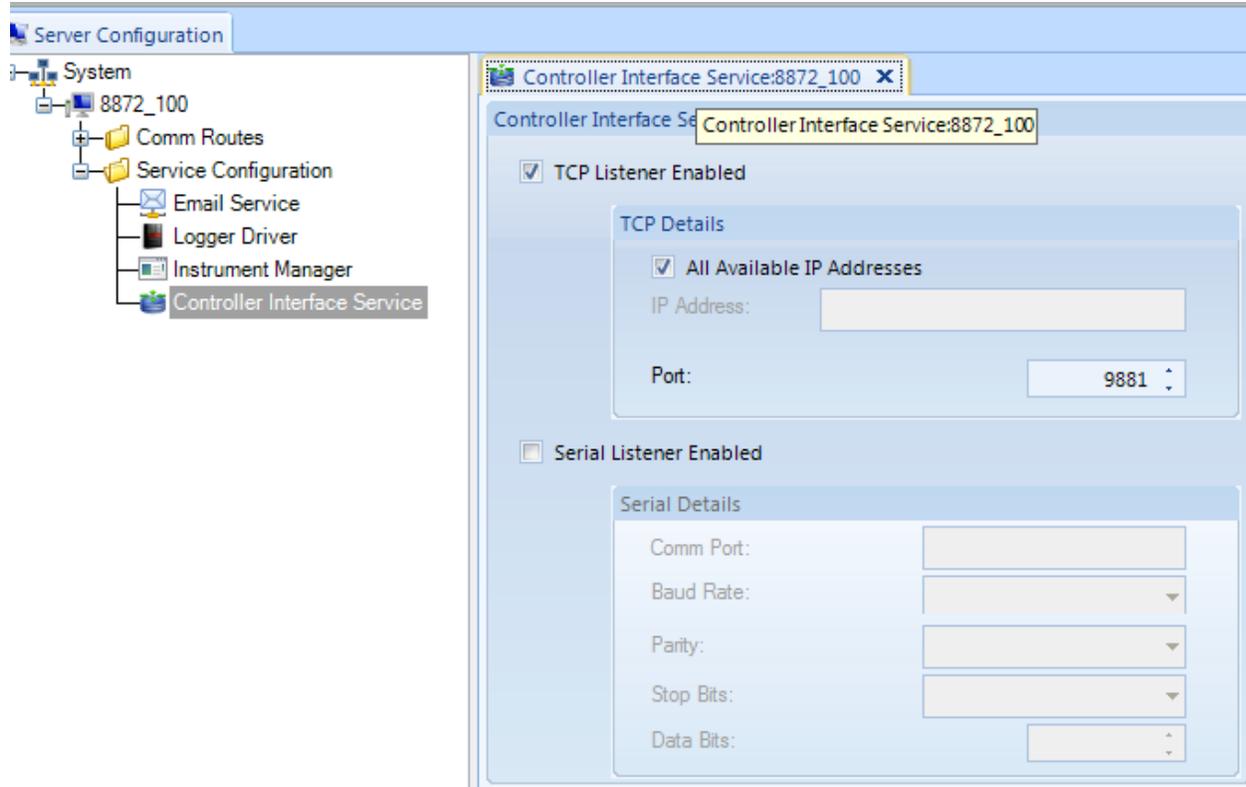
Although the Model 8872 itself is a fully capable stand-alone reporting platform, in most architectures the Model 8872 is connected to a Central Server or Data Management System (DMS) as the final repository of the data for multiple sites. The Model 8872 has three main communication methods for transferring data back to the Central/DMS:

- ◆ Controller Interface Service - in this mode, the Model 8872 emulates a Model 8816/8832 for data polling. It can be used for both legacy dial-up modem networks or TCP/IP networks. However, configuration download is not supported.
- ◆ FTP Push - This mode is more commonly used in TCP/IP networks where the a public/static IP address is not available for the remote site. In this mode, the Model 8872 pushes files back to the Central/DMS on a regular basis.

### 3.1 Controller Interface Service

The Controller Interface Service is a background service in the Model 8872 that allows the logger to emulate a Model 8832 for polling purposes. It supports all data polling (averages, calls, messages, power failures, etc), but does not support configuration download messages.

The service is normally enabled for each Model 8872 at the time of shipment, and can be found in the PC Configuration settings:



If it is not visible, you may right-click on the PC icon with the logger name, and add the “Controller Interface Service” to the list of plug-ins.

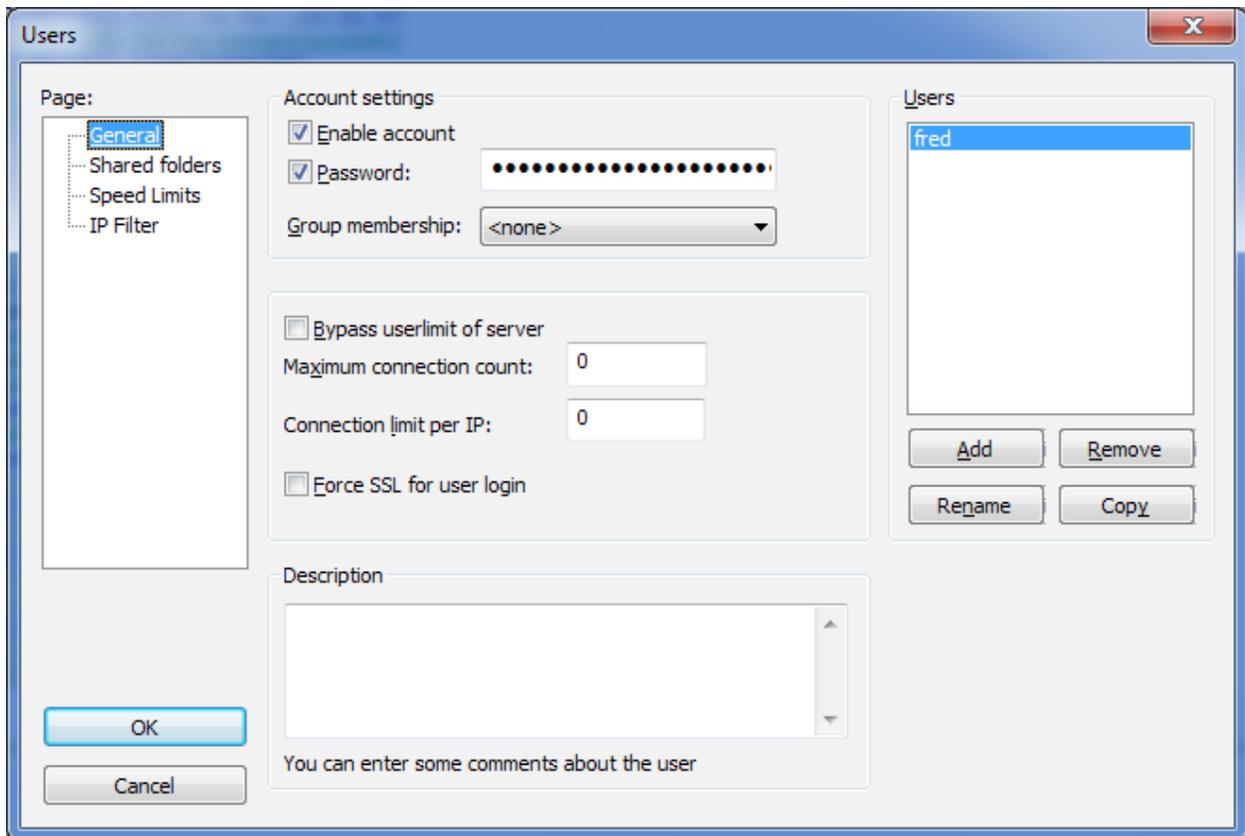
By default, the logger will listen for polling strings on port 9881, but this port may be changed if needed. The service can also be set to listen for polling commands on a serial port (e.g., COM1, COM2), but that port **may not be used for any other function**, such as direct instrument polling or Generic Serial Interface (GSI).

All incoming messages and generated responses are viewable in the Log Viewer (Utilities).

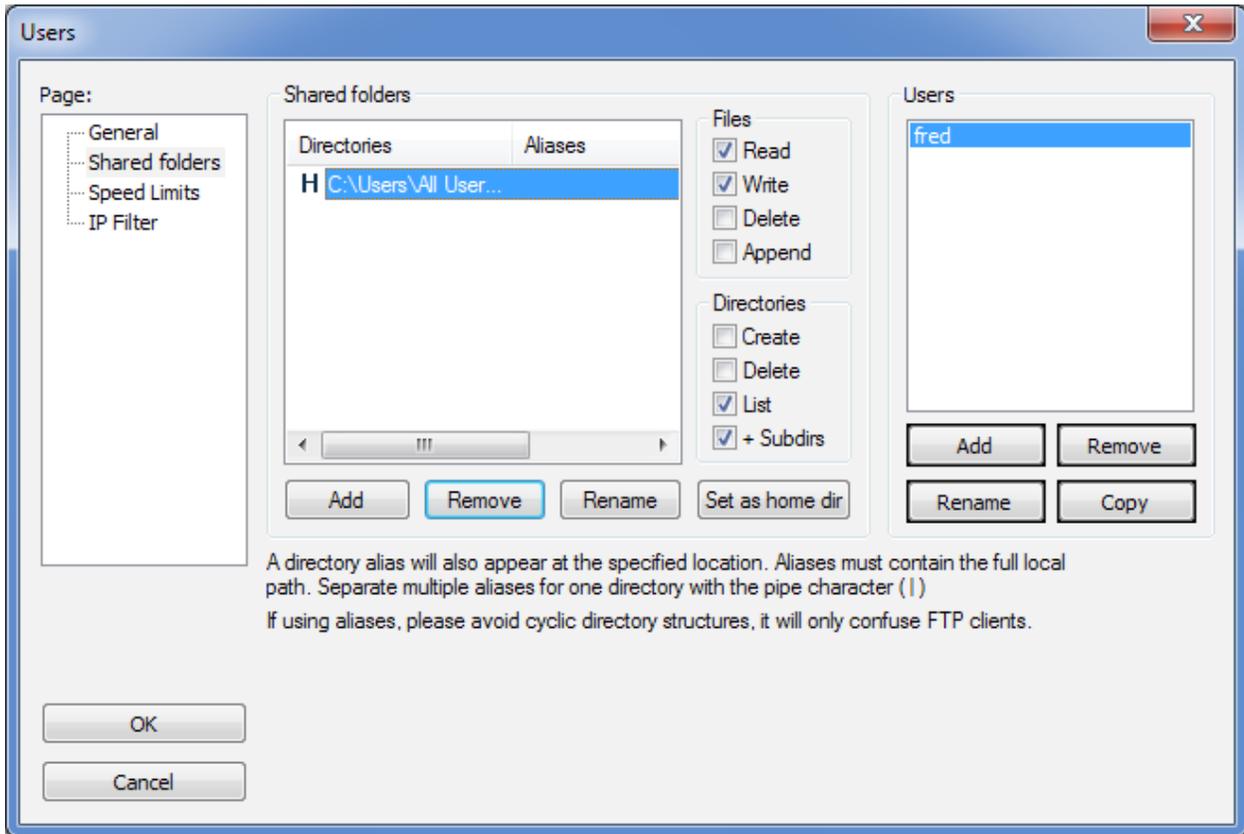
## 3.2 Setting up AirVision Server to Receive FTP Push

Install FileZilla FTP Server, set to run as a background service automatically.

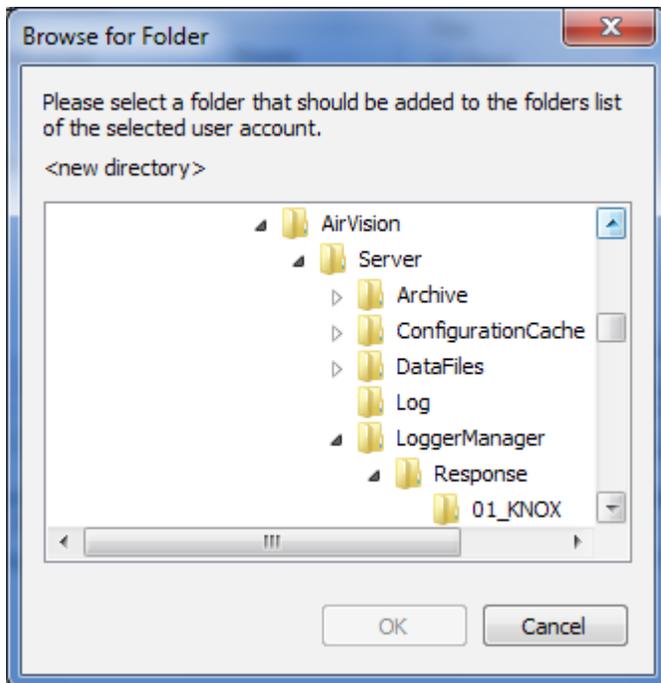
Start FileZilla manager (accept default logins) and use the Users **Add** button to create a new user. Set username and password. You will set up a unique user for each Model 8872 out in the field.



Once you have created the user, select the **Shared Folders** button.



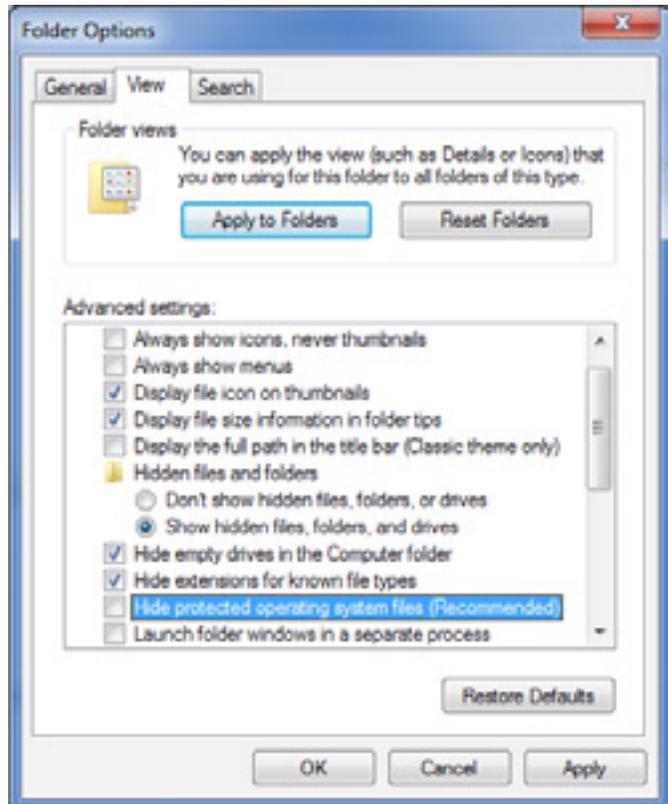
Use Add to create a new home directory for the user. Navigate to **Users->All Users->Agilaire->AirVision->Server ->Logger Manager->Response->(Site Name)**.



Make sure to define the user as having both read and write privileges.

If you do not see **All Users**, you will need to open Windows Explorer and select **Organize->File and Search Options**, and de-select **Hide Protected System Operating Files**. Once you have done this and selected **Apply**, you can re-open the file browser in Filezilla to re-select the desired folder.

Repeat this process for each site, creating a unique user for each site. *(Alternatively, you may choose one user and use the "Response" level as the home directory. In this case, in the FTP transfer program for the site, you can choose the appropriate subdirectory for the site).*



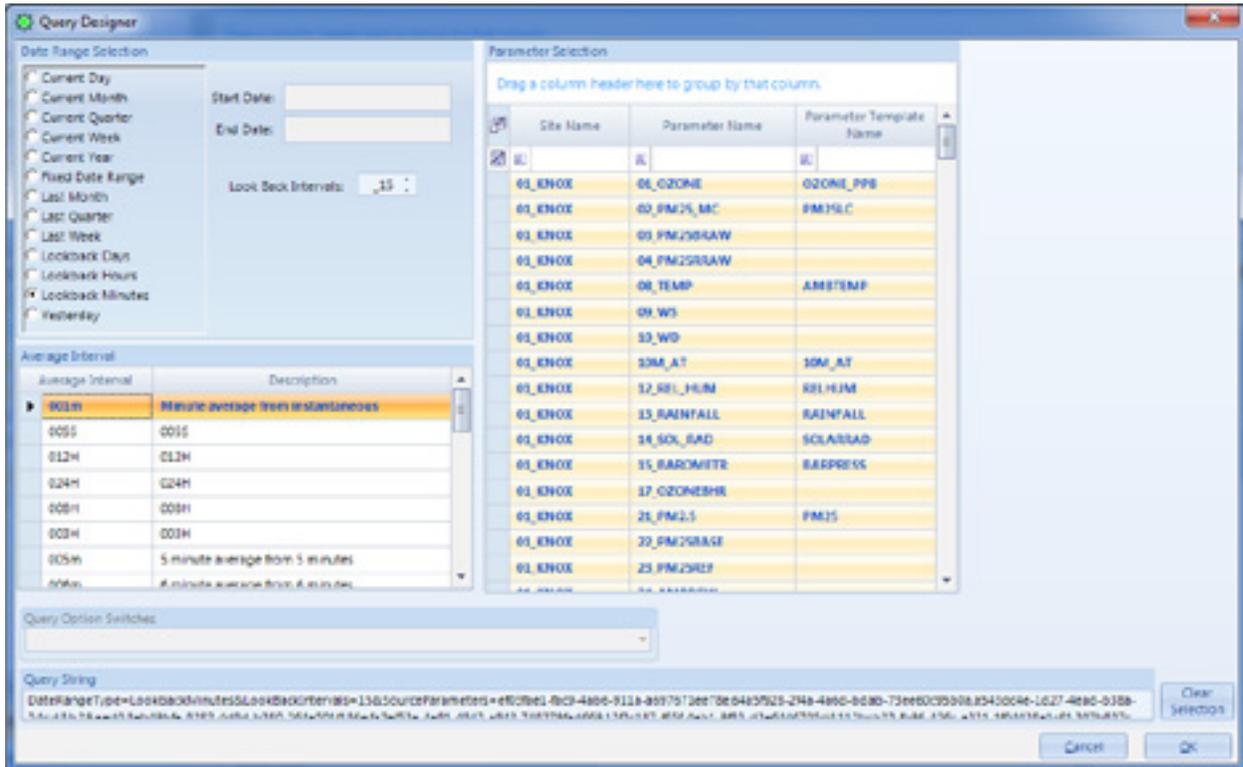
When this is done, you can create FTP programs in the Model 8872 (**Configuration->Report Configurations->FTP Programs**). Define the IP address or resolvable name for the Central PC you are pushing to, and enter the user name and password. Leave the other fields blank.

The image shows a screenshot of the 'AIRNow Transfer Details' configuration window. It contains several input fields and checkboxes:

- Program Name:
- Agency:
- FTP Host:
- Enable?:
- Directory:
- AIRNow?:
- User Name:
- Port:
- Buttons:

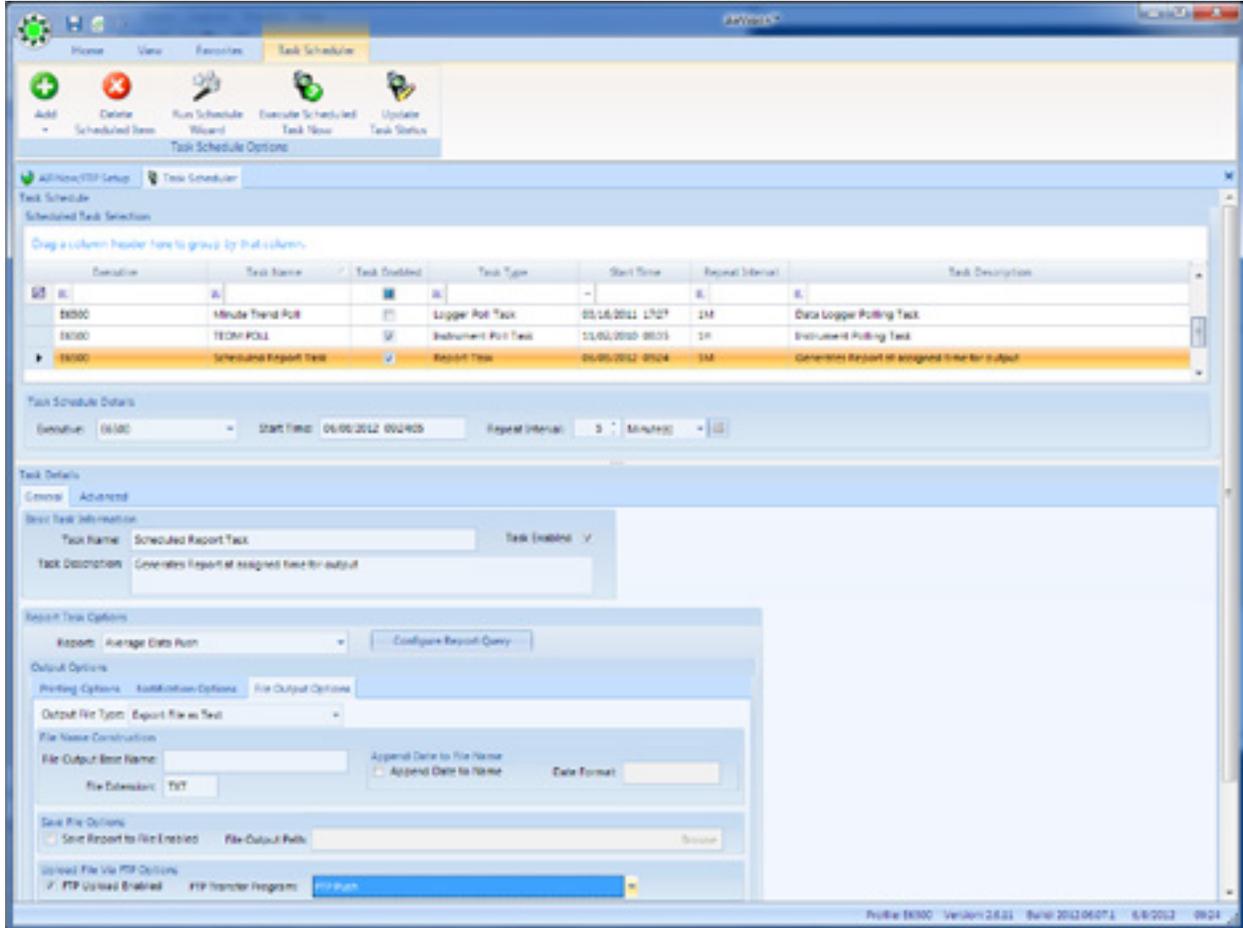
To create the individual push tasks, use **Configuration->Task Scheduler** and **Add->Scheduled Report Task** to choose any of the **Push** type reports. (Push Average Data, Push Calibration Data, etc). You may also wish to create **Group Task** and put all the **push** tasks under the group task for easier management.

Use the **Configure Report Query** button to choose the desired parameters, intervals, etc. for each push task. For the Date Range, we would recommend using **Lookback Minutes** and setting the lookback to a value equal to or greater than the task execution frequency (e.g., if pushing data every 5 minutes, set the lookback to at least 5 minutes). If the logger is polling another device through Instrument Polling (e.g., BAM), consider adding enough overlap to handle short-term communication outages to the other device.

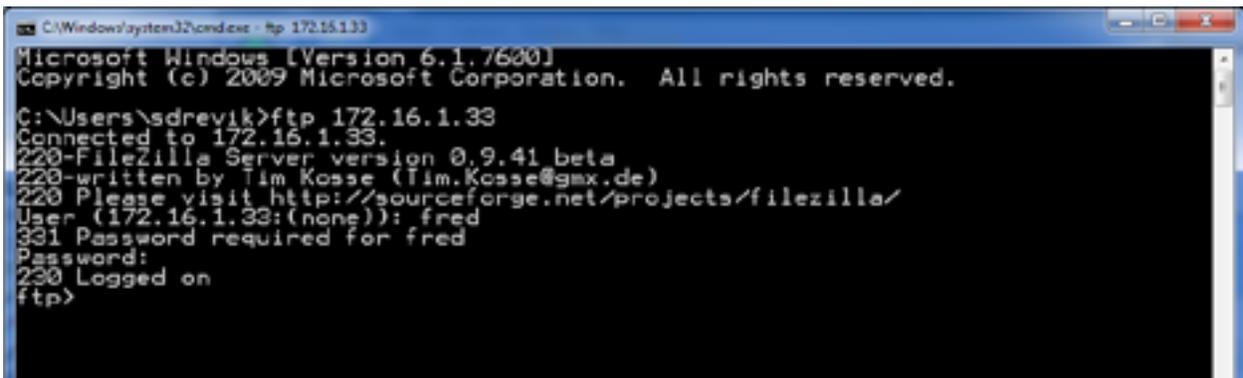


Note that for average data, you will need to make a push task for each averaging interval.

Finally, in the task, select **File Output Options**, select **FTP Enabled**, and choose your FTP program that you created earlier. You should define the file extension as RSP. You can choose anything you want for the file name. It is recommended that you select **Append Date To Name**.



Click **Save** and let the server restart. Pushes will start, and can be reviewed in the Scheduled Task Status display. If you encounter any FTP problems, test the connection from the 8872 by going to a DOS prompt and manually initiating an ftp:



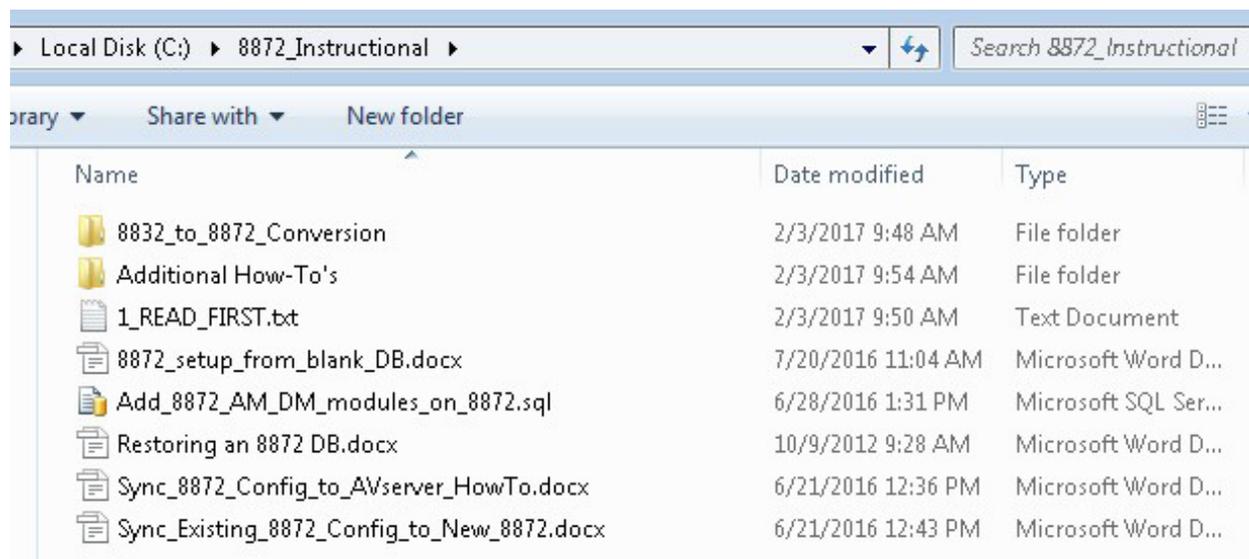
### 3.3 Central - Remote Sync Setup

To manage configuration between the server and the logger, the Model 8872 also supports a database-to-database synchronization. The advantage of this approach is the bidirectional update of settings, so that changes made either in the Central or in the Model 8872 are reflected on each end.

Sync can be used for configuration, logbook entries, and AirVision users and groups. For actual data retrieval the regular Model 8832 emulation polling (see “Controller Interface Service”, section 3.1) should be used.

Depending on your existing configuration and desired use of the 8872, there are various process documents available to assist you. These can be found on Agilaire’s FTP site where AVTrend updates are available (contact [support@agilaire.com](mailto:support@agilaire.com) if you need access information). They are also included on each 8872 that is shipped out from Agilaire.

The 8872\_Instructional folder provides a subfolder for the 8832 to 8872 conversion process as well as a selection of other how-to documents related to the 8872. Review the ‘1\_READ\_FIRST’ file to confirm your course of action.



- ◆ If you are deploying a new 8872 to replace an existing 8832 or 8816, go to the '8832\_to\_8872\_Conversion' folder.
  - ◆ **Read the '1\_Conversion\_READ\_FIRST' text file in the folder before you begin.**
- ◆ If you have an already configured 8872 on the AirVision server you wish to sync to a new 8872, use the Sync\_Existing\_8872\_Config\_to\_New\_8872' document.

- ◆ If you have an already configured 8872 logger you wish to sync to your AirVision server, use the 'Sync\_8872\_Config\_to\_AVserver\_HowTo' document.
- ◆ If you need to setup an 8872 using a blank database (not the As Shipped from Agilaire database), follow the '8872\_setup\_from\_blank\_DB' document in this folder.

### 3.4 Sync Contract Direction Options

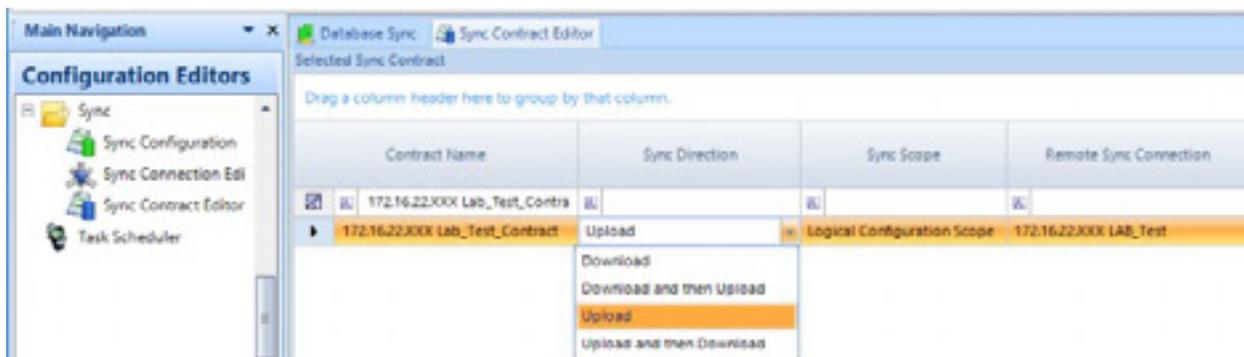
Before performing a sync, always check the Sync Direction.

Sync Contract Name	Sync Scope Name	Sync Direction	Remote Connection
172.16.22.XXX Lab_T...	Logical Configuration Scope	Upload	172.16.22.XXX LAB_T...

Sync Direction determines the action attempted by the sync execution.

- ◆ Download – transfers configuration changes FROM the 8872 TO the AirVision server
- ◆ Download then Upload - transfers configuration changes FROM the 8872 TO the AirVision server, then transfers configuration changes FROM the AirVision server TO the 8872; giving priority to the download action
- ◆ Upload – transfers configuration changes FROM the AirVision server TO the 8872
- ◆ Upload then Download - transfers configuration changes FROM the AirVision server TO the 8872, then transfers configuration changes FROM the 8872 TO the AirVision server; giving priority to the upload action

If it needs to be changed, use the Sync Contract Editor. Make the desired Sync Direction selection, save, then refresh the Database Sync tab before executing the sync.



## 3.5 Sync Troubleshooting Tips

The **Test Connection** button in the Sync Wizard (or in the Sync Connection Editor) can be used to test connectivity to the 8872 database. If you have difficulty, the following troubleshooting steps can be helpful:

- ◆ In **SQL Management Studio**, use the same settings (IP address, instance name, username, password) to try to connect to the remote site.
- ◆ From the AirVision server, use **TELNET** to try to open a basic TCP connection the site IP address and the designated port (or the default port 1433).
- ◆ Verify Windows Firewall settings and exceptions, ensure exception exists for port 1433.
- ◆ If the connection is refused, check router settings or check SQL settings to confirm which IP port is being used.

## Chapter 4

# Reports

After data has been polled, either by a scheduled task (**Configuration Editor>Task Scheduler**) or manually (**Utilities>Manual Poll**) the 8872 can run the following reports after the Criteria Pane has been configured:

### Basic Reports

- ◆ Daily Summary Report
- ◆ Daily Parameter Report
- ◆ Monthly Report

### Calibration Reports

- ◆ Calibration Results
- ◆ Calibration Trend Graph
- ◆ Calibration X-Bar-R Chart

### Configuration Reports

- ◆ Calibration Configuration Report
- ◆ Channel Configuration Report
- ◆ Parameter Configuration Report
- ◆ Scheduled Tasks Report
- ◆ Site Configuration Report

### Internal Reports

- ◆ DB Modification History
- ◆ Exception Journal
- ◆ Historical Log Viewer
- ◆ Journal Message Log
- ◆ Software Version Report
- ◆ Table Size Information

### Logger Reports

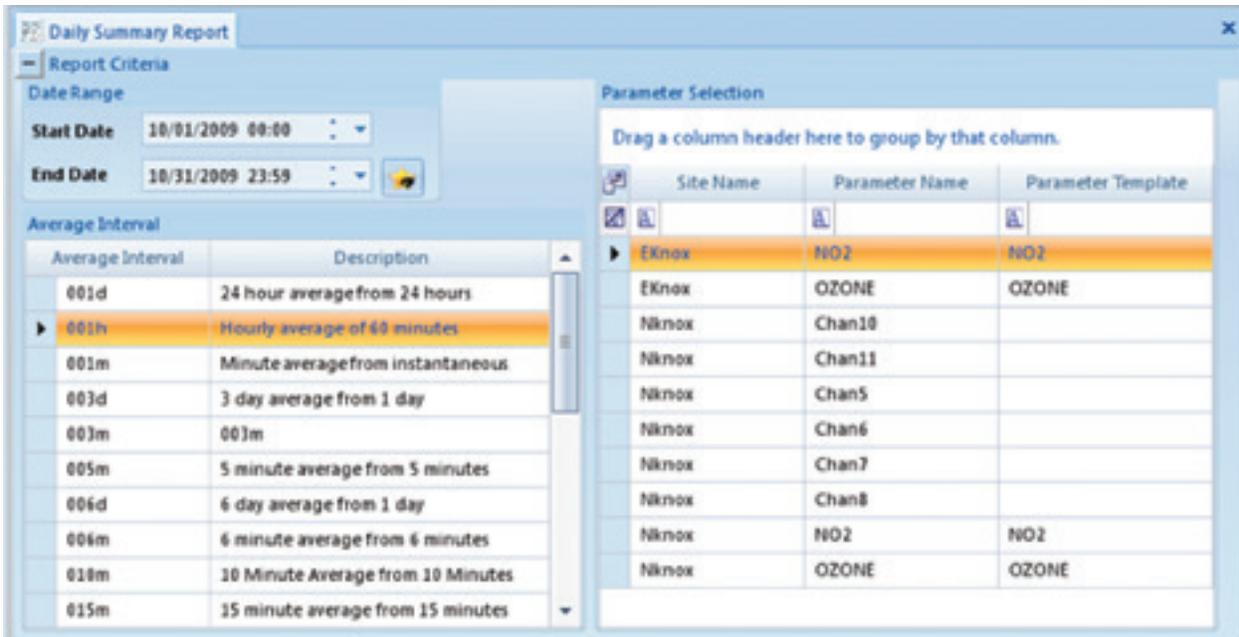
- ◆ Alarm Journal
- ◆ Input Line Status Report
- ◆ Power Failure Report

### Other Reports

- ◆ Annotations Report
- ◆ LogBook Report

## Criteria Pane

All reports use a Criteria Pane to select a time range and list of pollutants for the report.



Report Criteria pane in Reports > Daily Summary Report

You can select the Date Range any of the following ways:

- ◆ Manually type in a month, day, year, and time.
- ◆ Click in a date field (the month, date, year, hour, minute) and click the small up or down arrow keys to raise or lower that field (month, day, year, hour, minute). (It isn't necessary to highlight the field, just put the cursor in it.)
- ◆ Use the down arrow at the right end of the field to bring up a **Calendar**. You can click the arrows to change the month, or click the name of the month or year to bring up a list.
- ◆ Use the **Star** button to select from a pre-defined date range:

- Current Day
- Yesterday
- Current Week
- Last Week
- Current Month
- Last Month
- Current Quarter
- Last Quarter
- Current Year
- Number of days back from current day

In addition, the time criteria (e.g., the star icon button) allows you to choose “shift forward one day” or “shift backward one day.” If you select one of these and hit apply, it acts similar to the “Data Forward” or “Data Backward” buttons, except always shifting by 24 hours, rather than the size of the data window. This is useful for reviewing calibration minute data for several days, where the calibration falls on the same time each day.

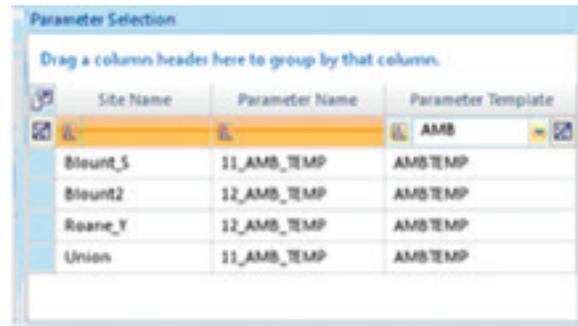
Scroll to select an **Average Interval** (most reports only support one average interval at a time).

Click to select a site and parameter; use standard Windows Shift-Click and Control-Click conventions to select multiple parameters.

### Filters

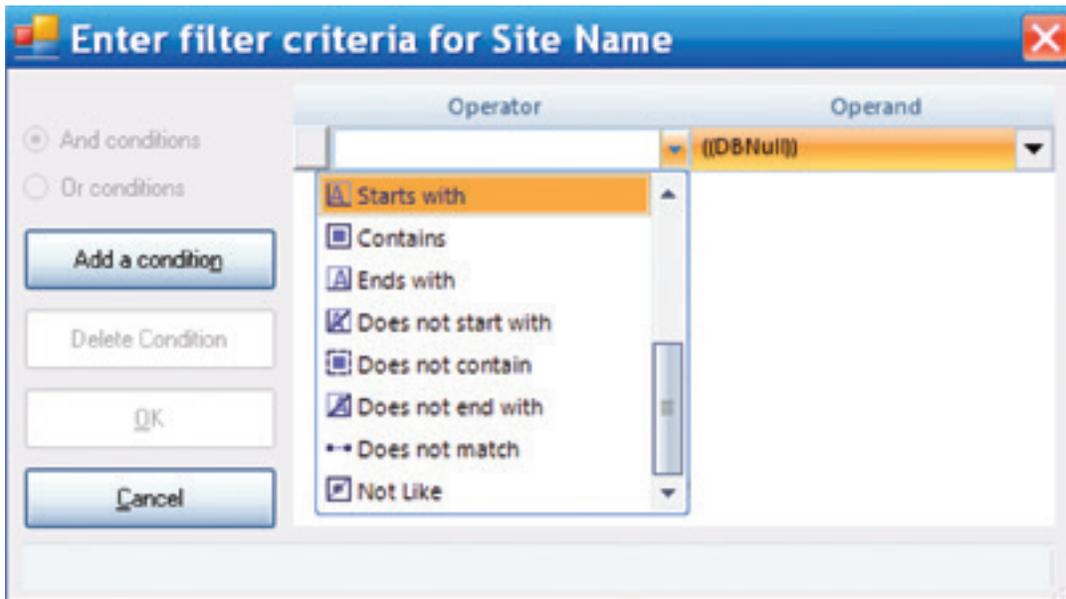
Filter fields are available in the top row of each column. Click in the row to use the filter to list a single site, parameter, or parameter template.

Click the down-arrow to the right of each filter field to select a particular entry in the column. Choices in the drop-down list will be Custom, Blanks, Non-blanks, plus each entry in the column (site name, parameter names, or parameter templates)



Filter fields in Reports criteria pane

To write your own criteria, select **Custom** and configure the screen that pops up.



Custom filter criteria screen

Click the box with the letter **A** in the left side of each filter field to change the filter field from the default of **Starts With** to one of the following:

- Equals
- Does not equal
- Less than
- Less than or equal to
- Greater than or equal to
- Like
- Matches Regular Expression
- Starts with
- Contains
- Ends with
- Does not start with
- Does not contain
- Does not end with
- Does not match
- Not like

For example, if you imported E-DAS data and used the option to put the channel number in front of the channel name, you might end up with some ozone channels that were “01\_OZONE” while others were “03\_OZONE” and “04\_OZONE”. Using the boxed “A” filter, you could search for all parameters names that contain “Ozone” and more easily select them from a large list of parameters.

Parameter Selection

Drag a column header here to group by that column.

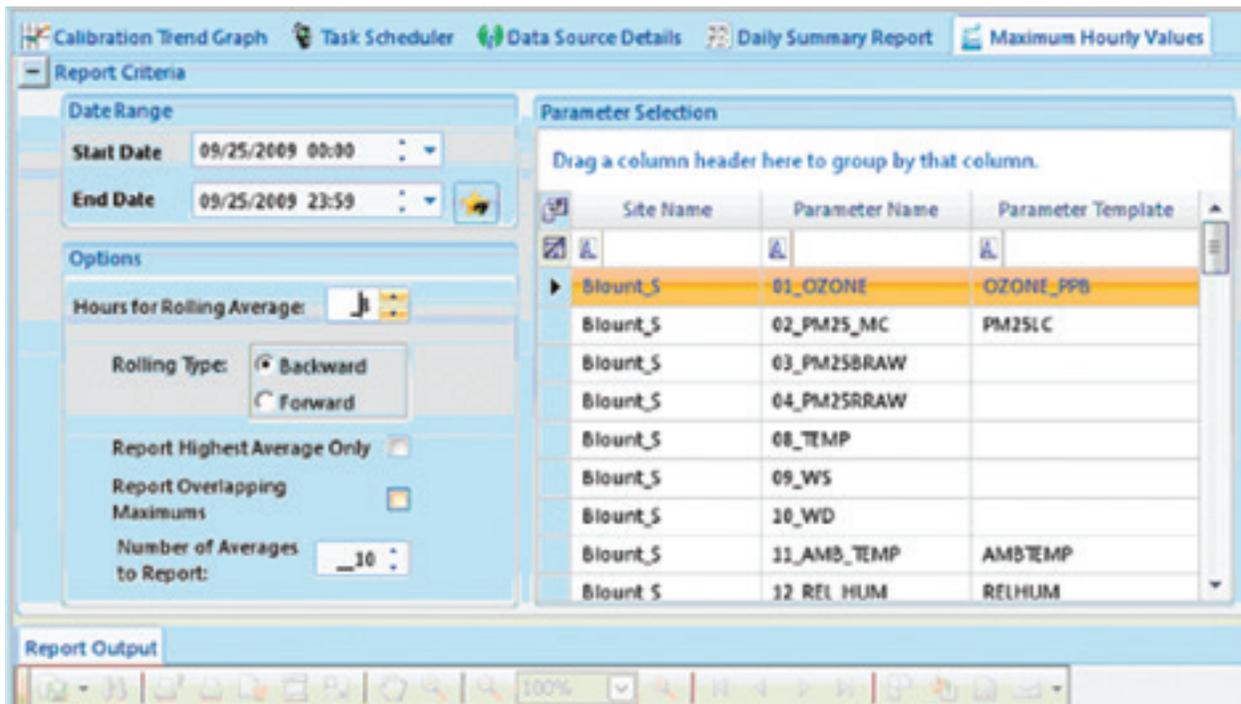
Site Name	Parameter Name	Parameter Template
Blount_5	11_AMB_TEMP	AMBTMP
Blount2	12_AMB_TEMP	AMBTMP
Brainerd	03_AMB_TEMP	
Roane_Y	12_AMB_TEMP	AMBTMP
Union	11_AMB_TEMP	AMBTMP

Using a filter to determine which parameters do not have a template

### Additional Fields for Specific Reports

For some reports, the Criteria Panel is expanded with additional fields. For the Maximum Hourly Averages report, additional information is needed on how the data in the report should be filtered and calculated:

- ◆ Rolling hours, and time-tagging type
- ◆ Report highest average only for any day
- ◆ Allow report of overlapping maximums (for multiple hour rolling averages)
- ◆ Number of maximum averages to report



Additional Report Criteria required for Maximum Hourly Values report

Other reports with additional criteria include:

- ◆ Wind / Pollution Rose requires you to designate which Wind Rose report profile to use.
- ◆ AQS/XML Report requires you to choose which kinds of records to be assembled.
- ◆ Concentration Distribution, Frequency Distribution, Monthly Reports all allow you to designate an N-hour rolling average as an option.

## Basic Reports

### Daily Summary Report

The Daily Summary Report is usually used for the daily summary of hourly data for all parameters at a site or sites, but it can also be used to report any time range or average interval. Statistics (Average, Maximum, Minimum, and Count) are at the bottom of each column.

To generate a Daily Summary Report (**Reports > Daily Summary Report**), select Start and End Dates, an Average Interval, Site Name or Names, and Parameter Name or Names. Click the Generate Report icon on the Ribbon.

Current Time: 3/9/2009 2:18:57 PM

### Daily Summary Report

Site: SITEONE

9/1/2007

Interval 001h

	AMBTMI	OZONE	RAINFALL	RELHUM	RWDR	RWSP	SIGTHET	SOLARRA	SWSP
Hour									
00:00	13.5	78	0	99	126	4.4	9	0	4.4
01:00	13.6	78	0	99	122	4.5	10	0	4.5
02:00	13.5	83	0	99	136	4.5	8	0	4.5
03:00	13.8	88	0	100	143	3.9	8	0	3.9
04:00	13.8	87	0	100	125	3.8	10	0	3.8
05:00	13.5	86	0	100	110	3.2	10	0	3.2
06:00	13.4	83	0	100	110	3	9	36	3
07:00	14	79	0	100	103	2.7	13	193	2.7
08:00	14	78	0	99	101	2.9	12	259	2.9
09:00	14	73	0	98	102	2.2	16	157	2.2
10:00	14.9	68	0	94	110	2.5	18	345	2.5
11:00	15.5	64	0	91	121	2.2	22	357	2.2
Average	13.958	78.75		99.083	117.417	3.3	12.083	112.25	3.3
Max	15.5	88	0	100	143	4.5	22	357	4.5
Min	13.4	64	0	91	101	2.2	8	0	2.2
Count	12	12	12	12	12	12	12	12	12

Daily Summary Report

### Daily Parameter Report

The Daily Parameter Report shows a single day summary for the entire monitoring network, grouping parameters together by the Parameter Template, but showing all sites sharing that parameter template.

Parameters that do not have a parameter template designated are not reported.

To generate a Daily Parameter Report (**Reports > Daily Parameter Report**), select Start and End Dates, an Average Interval, Site Name or Names, and Parameter Name or Names. Click the Generate Report icon on the Ribbon.

		Daily Parameter Report																													
3/1/2006		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Summary					
Parameter	Stations																									Avg	Min	SD			
AMBIEMP	11_Rain	-8.1	-8.7	-10.8	-11.8	-12.7	-11.9	-11.9	-10.9	-9.9	-8.6	-7.4	-6.6	-4	-3	-2	-1.5	-2.1	-3.5	-4.3	-5.3	-5.2	-5.5	-7.2	-1.5	24					
	12_Rain	-8.4	-8.7	-8.8	-10.4	-10.4	-10.7	-11.6	-10.3	-8.9	-7.9	-6.8	-6.8	-6.6	-6.6	-4.2	-4	-4.2	-5.3	-6	-6.2	-6.6	-7.1	-7.5	-7.3	-4	24				
	Wvent	-11.1	-10.4	-11	-11.8	-12.9	-13.9	-14.8	-14.1	-13	-12.2	-10.7	-8.7	-6.7	-6.2	-5.5	-4.5	-4.4	-4.4	-3.9	-3.5	-3	-3	-3.4	-3.8	-4.2	-3	24			
CO	11_Rain		-4	-4	-4	-4	-4	-4	5	5	5	5	4	4	4	4	5	5	5	4	5	5	4	4	5	5	3	23			
NO	11_Rain		1.8	6	3	5.4	1.5	2.2	7.1	5.8	4.8	11.8	5	9	4.4	6.4	11.3	5.8	9.3	5.9	7.9	8.2	16.5	11.8	8.3	6.8	16.5	23			
NO2	11_Rain		5.3	7.3	19.2	31	4.2	4.9	8.7	5.1	4.2	7.8	4.4	4.2	4.3	5.6	8.9	8	13.3	8.9	14.1	21.5	23.5	13.3	21.2	19.5	23.5	23			
NOX	11_Rain		8.2	9.1	23.3	27.5	6.7	7.9	16.8	11.5	9.7	17.8	10.2	13.9	9.6	13.9	22.1	14.7	23.2	15.8	23.8	31.2	48.8	26	38.8	17.9	48.8	23			
OZONE_PP9	12_Rain		35.9	37.3	41.4	41.4	40.5	38.6	39.3	40.6	40.5	40.8	40.4	40.8	40.5	41.1	41.9	42	42.1	41.4	42	42	41.2	39.4	36.9	40.3	42.1	23			
PM25C	11_Rain	5.8	5.3	4.3	7.4	11.6	5.5	1.4	5.4	4	6.2	4.8	4.1	3.8	3.2	3.8	3.4	5.2	6	5	5.5	4.3	6.9	7.5	5.6	5.4	11.6	24			
	12_Rain	7	10.2	6.8	2.9	2.8	2.9	5	4.2	9.7	7.2	3	3.3	4.7	3.4	2	3.2	3.2	3.3	5.4	4.5	3.4	3.3	5.2	7.1	4.5	10.2	24			
RAINFALL	Wvent	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24			
RELHUM	11_Rain	96.8	88.2	87.5	71.4	75.1	89.7	84.8	82.9	57.4	48.6	48.3	42.3	35.8	38.8	29.2	27.7	25.8	28	31.8	43.1	44	44.9	45	49.1	48.6	75.1	24			
	12_Rain	88.8	72.1	68.2	55.1	52.8	58.1	69.6	57.5	49.7	44.3	38.5	24.9	33.9	36.2	25.8	32.8	41	45.9	48.8	51.1	52.7	58.7	61.1	65.9	51.7	89.8	24			
	Wvent	67.9	55	55.3	65.8	51	54.4	62.2	61.7	51.2	45.6	40.3	38.7	35.5	35.6	38.7	37	37	38.8	38.3	36	34.8	35.8	35	37	45.8	67.9	24			
SO2	11_Rain		4.4	5.9	16.7	15.3	3.8	3.4	3.8	3.1	4.2	3.3	3.8	7.2	4.3	1.5	1.2	1.5	1.8	2.3	4.5	4.8	5.2	4.4	4.7	4.7	15.7	23			
VWDR	11_Rain	200.8	227	214.8	158.1	228.8	303.4	311.1	291.6	248	270.1	218.1	289	274.8	281.1	227.3	286.2	214.4	217.8	195	163.7	158.8	158.2	170.5	152.6	228.2	303.4	24			
	12_Rain	266.4	262.7	260.9	232.5	236	237.4	258.6	263.6	288.4	288	272.3	271.3	248.1	234.8	231.8	235.4	232.5	248	230.5	229.2	218.2	216.8	211.2	207.6	244	288.4	24			
	Wvent	196.4	278.4	227.1	228.8	199.1	199	152.8	121.6	125.3	140.8	144.5	122.9	129.1	185.7	181.4	164.7	151.5	144.3	140.4	147.9	195.9	161.2	131.4	144.2	165.9	278.4	24			
VWSP	11_Rain	1.8	1.9	1.4	1	1.6	2.5	2.3	2.1	2.6	3	1.5	2.4	3.2	2.3	2.4	2.3	2.4	1.8	2.7	2.2	1.5	1.5	1.9	1.4	3	2.7	24			
	12_Rain	1.9	2.1	1.9	2.2	2.1	2.6	1.4	1.7	2.6	3	3.2	3.1	3.3	4.1	3.7	4.1	3.9	3	2.3	2.8	2.4	1.9	1.3	1.2	2.8	4.1	24			
	Wvent	1.8	4.3	2.5	2.1	1.8	2.1	1.8	1.9	1.8	1.8	1.7	1.1	1.4	2	2.3	1.9	1.8	1.8	1.1	2	1.9	1	1.5	1.5	1.8	4.3	24			

Daily Parameter Report (Reports > Daily Parameter Report)

### Monthly Report

Monthly reports provide a matrix view of a single parameter, showing values for the entire month. Invalid or flagged data is shown with a color background or font change defining the data condition. Statistics are provided for each row (day) and column (hour).

To run a **Monthly Report**:

1. Select **Reports > Monthly Report**.
2. Select a **Start** and **End** date
3. Select number of **Hours for Rolling Average**
4. Select a **Rolling Type (Backward or Forward)**
5. Select the **Parameters** that will be displayed in the report
6. If you want the **Flags Legend** to be shown in the report, click to select **Flags**. (You may have to scroll down to see the Flags option).
7. Click the **Generate Report** button on the Ribbon.

► **Note:** If **Totalize in Reports** was selected in **Configuration Editors > Parameter Settings**, Monthly Reports will show a total of data rather than an average. If **Minimum in Reports** was this option was selected in **Configuration Editors > Parameter Settings**, Monthly Reports will show a minimum of data rather than an average or a total. Totalize in Reports and Minimum in Reports are most commonly used for rainfall.

Current Date: 10/13/2013 10:43 AM		SiteName: 01_KVQX 095 : 0304		Parameter: 01_C3 44201		Monthly Report February 2006		Avg Interval: 1 hour		Units: FFB 008		Method: 880																
Day	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Summary			
																										Max	Avg	POS
01		27	29	29	29	27	28	28	31	31	35	35	35	35	37	37	38	35	34	33	32	28	23	39	32	23		
02	113	15	16	20	21	20	15	19	19	17	23	25	26	27	25	25	22	16	9	7	12	20	24	25	113	23	24	
03	119	30	31	33	32	32	32	31	28	31	199	24	24	33	33	32	34	31	35	35	35	35	31	38	194	45	24	
04	121	35	35	32	28	21	20	13	14	25	23	35	35	37	42	41	38	35	35	35	35	35	35	35	35	121	35	24
05	125	35	35	35	32	35	35	42	35	35	21	21	21	20	20	24	20	20	24	25	25	25	25	25	125	21	24	
06	119	35	31	35	31	35	35	35	35	37	42	42	42	42	42	42	42	35	35	37	35	34	33	33	119	35	24	
07	126	34	35	35	35	18	34	34	33	34	35	35	35	19	19	19	19	19	19	19	19	19	19	19	17	126	24	24
08	C	15	15	14	14	15	17	11	14	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	25
09	C	32	30	31	31	30	28	32	26	32	34	N	N	23	29	30	31	32	33	33	34	35	35	35	35	30	21	
10	C	35	34	33	32	32	32	33	34	35	35	37	35	35	35	42	42	35	35	35	35	35	35	35	35	42	35	23
11	C	32	30	29	19	20	19	21		31	37	35	42	35	37	35	35	37	30	28	35	35	37	35	42	32	22	

Monthly Report with Parameter Code

If **AQS Null Codes** have been set for invalidated data, they are displayed in the **Monthly Report**. If Site Codes, and/or Parameter codes have been selected in the Configuration Menu they will be included in the Header. Options are provided to show null codes or flags when an invalid hour is shown on the report. These options are also available in the Scheduled Task (options).

If you select **Historical Graph** from the Ribbon, you can view data in a graph. Each color represents a different phase, as shown in the legend. You can change the color scheme by selecting a **Graph Theme** from the drop down list at the bottom of the screen.

Parameter Selection

Site Name	Parameter Name	Parameter Template
Agilaire	NOX	NOX
Agilaire	OZONE	OZONE
Agilaire	PM10	PM10
Agilaire	PM25	PM25

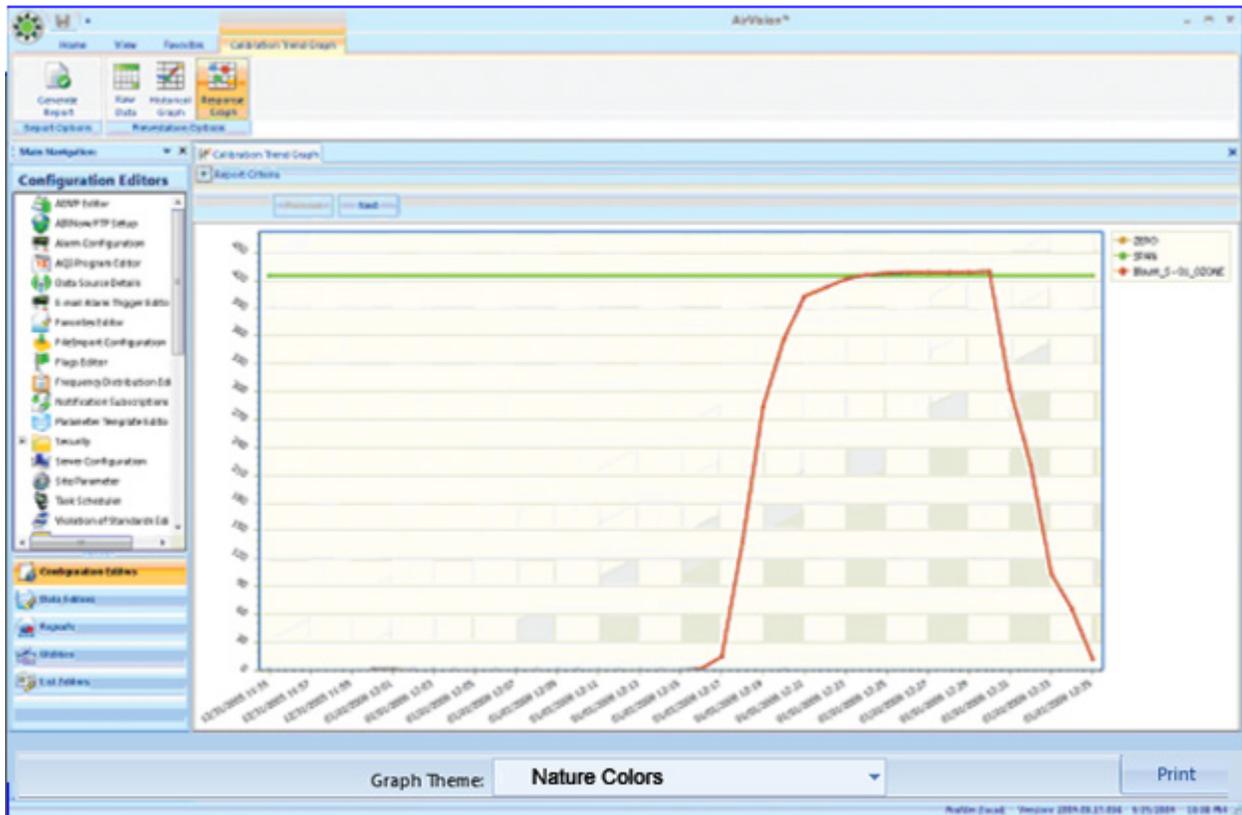
  

Site	Parame...	Source	Calbrat...	Phase Number	Phase Name	Start Date	EndDate	Expected V...	Value	Difference
Agil...	OZONE	09Logger	Cal1	1	Phase0	6/2/2010 6:00 PM	6/2/2010 6:05 PM	0	0.489576...	-0.489576518
Agil...	OZONE	09Logger	Cal1	2	Phase1	6/2/2010 6:00 PM	6/2/2010 6:10 PM	2	-1.3028912	3.3028912
Agil...	OZONE	09Logger	Cal1	3	Phase2	6/2/2010 6:00 PM	6/2/2010 6:15 PM	0	0.94302392	-0.94302392
Agil...	OZONE	09Logger	Cal1	1	Phase0	6/2/2010 7:00 PM	6/2/2010 7:05 PM	0	-1.2476368	1.2476368
Agil...	OZONE	09Logger	Cal1	2	Phase1	6/2/2010 7:00 PM	6/2/2010 7:10 PM	2	0.059208...	1.940791533
Agil...	OZONE	09Logger	Cal1	3	Phase2	6/2/2010 7:00 PM	6/2/2010 7:15 PM	0	1.27934455	-1.27934455
Agil...	OZONE	09Logger	Cal1	1	Phase0	6/2/2010 8:00 PM	6/2/2010 8:05 PM	0	1.15639686	-1.15639686
Agil...	OZONE	09Logger	Cal1	2	Phase1	6/2/2010 8:00 PM	6/2/2010 8:10 PM	2	0.040419...	1.959580705
Agil...	OZONE	09Logger	Cal1	3	Phase2	6/2/2010 8:00 PM	6/2/2010 8:15 PM	0	-0.07644...	0.07644924
Agil...	OZONE	09Logger	Cal1	1	Phase0	6/2/2010 9:00 PM	6/2/2010 9:05 PM	0	1.57154619	-1.57154619
Agil...	OZONE	09Logger	Cal1	2	Phase1	6/2/2010 9:00 PM	6/2/2010 9:10 PM	2	-1.9492111	3.9492111
Agil...	OZONE	09Logger	Cal1	3	Phase2	6/2/2010 9:00 PM	6/2/2010 9:15 PM	0	0.600318...	-0.600318133
Agil...	OZONE	09Logger	Cal1	1	Phase0	6/2/2010 10:0...	6/2/2010 10:0...	0	1.54926729	-1.54926729
Agil...	OZONE	09Logger	Cal1	2	Phase1	6/2/2010 10:0...	6/2/2010 10:1...	2	0.955369...	1.044630647
Agil...	OZONE	09Logger	Cal1	3	Phase2	6/2/2010 10:0...	6/2/2010 10:1...	0	0.107580...	-0.107580579

Profile: HP\_SERVER Version: 1.0.5 Build: 2010.04.25.1 6/3/2010 13:09

Historical Calibration Trend Graph

If you select **Response Graph** from the Ribbon at the top of the screen, you can review fine-resolution data during each calibration cycle to see instrument response. Each cal can be cycled through using the **Forward/Back** button. You can change the color scheme by selecting a **Graph Theme** from the drop down list at the bottom of the screen.



Calibration Trend Response Graph



## Calibration Reports

### Calibration Results

Calibration Results show the calibration event and results for any zero/span, precision check, or other calibration program.

Current Date : 3/9/2009							
Current Time : 3:47 PM		Calibration Report					
Site:	SITEONE						
Source:	Logger01						
Date:	02-Jul-2008						
Parameter	Sequence	Phase	Start Time	End Time	Value	Expected Value	% Error
test1	TESTCAL	PHASE1	00:00:00	00:01:00	1.123	1	12.35

Calibration Report

### Calibration Trend Graph

**Calibration Trend Graphs** provide a long-term view of calibration zero/span results over a user-defined period of time (month, quarter, etc). Select a **Start** and **End Date** and a **Parameter**. Click the **Generate Report** icon on the ribbon.

If you select **Raw Data Graph** from the ribbon at the top of the screen, you can view calibration data in a text table.

Drag a column header here to group by that column

Site	Parameter	Source	Calibration	Phase Number	Phase Name	Start Date	EndDate	Expected Value	Value	Difference
SITEONE	COZONE	01	Autocal	1	Zero	10/11/2009 3:15 AM	10/11/2009 3:20 AM	0	-0.06620079	0.06620079
SITEONE	COZONE	01	Autocal	2	Span1	10/11/2009 3:15 AM	10/11/2009 3:25 AM	10	-0.06620765	30.06620765
SITEONE	COZONE	01	Autocal	3	Span2	10/11/2009 3:15 AM	10/11/2009 3:30 AM	20	-0.06617844	20.06617844
SITEONE	COZONE	01	Autocal	1	Zero	10/12/2009 3:15 AM	10/12/2009 3:20 AM	0	3.2763E-05	-3.2763E-05
SITEONE	COZONE	01	Autocal	2	Span1	10/12/2009 3:15 AM	10/12/2009 3:25 AM	10	1.8674E-05	9.99998324
SITEONE	COZONE	01	Autocal	3	Span2	10/12/2009 3:15 AM	10/12/2009 3:30 AM	20	1.3048E-05	19.99998954
SITEONE	COZONE	01	Autocal	1	Zero	10/13/2009 3:15 AM	10/13/2009 3:20 AM	0	3.8957E-05	-3.8957E-05
SITEONE	COZONE	01	Autocal	2	Span1	10/13/2009 3:15 AM	10/13/2009 3:25 AM	10	4.1682E-05	9.99998318
SITEONE	COZONE	01	Autocal	3	Span2	10/13/2009 3:15 AM	10/13/2009 3:30 AM	20	2.7749E-05	19.99997225

Raw Data Calibration Display



## Configuration Reports

### Calibration Configuration Report

To run a Calibration Configuration Report (**Reports > Configuration folder > Calibration Configuration Report**), select a site or sites and click the **Generate Report** icon on the Ribbon.

<b>Calibration Configuration Report</b>									
<b>Agilaire</b>									
<u>Calibration Name</u>	<u>Start Time</u>	<u>Repeat Interval</u>	<u>Recovery Time</u>	<u>Phase Name</u>	<u>Phase Number</u>	<u>Duration</u>	<u>Response Time</u>	<u>Status Pattern</u>	<u>Affected Channel</u>
Auto 1	03/10/11 00:00	001D	005M	Zero	1	005M	001M	1	NO2

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Calibration Configuration Report (Reports > Configuration folder > Calibration Configuration Report)

### Channel Configuration Report

To run a Channel Configuration Report (**Reports > Configuration folder > Channel Configuration Report**), select a Site or Sites and a Parameter Name or Parameter Names. Click the **Generate Report** icon on the Ribbon.

Channel Configuration Report																								
Agilaire																								
Parameter Name	Source Name	Logger Id	Channel #	Channel Name	Unit	Type	Round Precision	Intervals			Storage		Analog Input		Input High	Input Low	Output High	Output Low	Hold Release	Secondary Input Channel	Input Name	Rolling Interval Name	General Value	
								Base	Ext.1	Ext.2	Base	Ext.1	Ext.2	Channel									Channel	Duration
WDR	Logge 01	01	1	WDR	DE0	8	1	00hm	015m	00h	7D	31D	1											
WSP	Logge 01	01	2	WSP	KPH	7	1	00hm	015m	00h	7D	31D	1											
H02	Logge 01	01	3	H02	PPM	A	1	00hm	015m	00h	7D	31D	3											

Channel Configuration Report (Reports > Configuration folder > Channel Configuration Report)

### Parameter Configuration Report

To run a Parameter Configuration Report, (**Reports > Configuration folder > Parameter Configuration Report**), select a Site or Sites and a Parameter Name or Parameters Names. Click the **Generate Report** icon on the Ribbon.

Parameter Configuration Report																		
Agilaire																		
Name	Description	Template	Reported	Precision	Unit	Graph		Instrument Detection Limit	Yetales.in	Minimum	Reset in	Report in	AirNew	Enabled	POC	Method	Unit	Parameter
			Digit			Minimum	Maximum											
WDR	Wind Direction, High Level	WDR_HIGH	4	1	DEG	0	360		False	False	True	True					007	61102
WSP	Wind Speed, High Level	WSP_HIGH	4	1	KPH	0	100		False	False	True	True						61101
NO2	Nitric Oxide	NO2	4	3	PPM	0	500		False	False	True	True	1				007	42602
NO	Nitrous Oxide	NO	4	3	PPM	0	500		False	False	True	True	1				007	42601
NOX	Oxides of Nitrogen	NOX	4	3	PPM	0	500		False	False	True	True	1				007	42603

Parameter Configuration Report, (Reports > Configuration folder > Parameter Configuration Report)

## Scheduled Tasks Report

To run a Scheduled Tasks Report, open **Reports > Configuration folder > Scheduled Tasks Report** and the report will be displayed automatically. No query is necessary.

### *Scheduled Task Report*

<i>Task Name</i>	<i>Description</i>	<i>Enabled</i>	<i>Start Time</i>	<i>Repeat Interval</i>
<b>Scheduled Report Task</b>	Generates Report at assigned time for output	True	3/2/2011 11:54:02 AM	ID
<b>Logger Poll Task</b>	Data Logger Polling Task	True	3/3/2011 12:34:32 PM	ID

*Thursday, March 17, 2011*

*Page 1 of 1*

Scheduled Task Report (Reports > Configuration folder > Scheduled Tasks Report)

## Site Configuration Report

To run a Site Configuration Report, (**Reports > Configuration folder > Site Configuration Report**), select a Site or Sites and click the **Generate Report** icon on the Ribbon.

### *Site Configuration Report*

**Agilaire:**

Description: main site  
Abbreviation: 01  
Address: 2904-B  
City: Knoxville  
County: Knox  
Zip Code: 37918

Latitude: 35.9605  
Longitude: -83.9208  
Time Zone: EST  
Agency Code: 0581  
State Code: 47  
CountyCode: 093  
Site Code:

Thursday, March 17, 2011

Page 1 of 1

Site Configuration Report, (Reports > Configuration folder > Site Configuration Report)

## Internal Reports

### DB Modification History

The Database Modifications Report lists all modifications that were made to the AirVision database by Agilaire.

## Database Modifications Report

---

<b>Schema Name</b>	dbo
<b>Name</b>	f_CreateGuidIdStringFromInteger
<b>Type Description</b>	SQL_SCALAR_FUNCTION
<b>Creation Date</b>	3/29/2010 4:18:07 PM
<b>Last Modified</b>	3/29/2010 4:18:07 PM
<b>Parent Name</b>	

---

<b>Schema Name</b>	dbo
<b>Name</b>	f_DateValue
<b>Type Description</b>	SQL_SCALAR_FUNCTION
<b>Creation Date</b>	3/29/2010 4:18:07 PM
<b>Last Modified</b>	3/29/2010 4:18:07 PM
<b>Parent Name</b>	

---

<b>Schema Name</b>	Reporting
<b>Name</b>	TableSizeInformation
<b>Type Description</b>	VIEW
<b>Creation Date</b>	3/29/2010 4:18:07 PM
<b>Last Modified</b>	3/29/2010 4:18:07 PM
<b>Parent Name</b>	

---

<b>Schema Name</b>	dbo
<b>Name</b>	f_GetDBServerUTCOffset
<b>Type Description</b>	SQL_SCALAR_FUNCTION
<b>Creation Date</b>	3/29/2010 4:18:08 PM
<b>Last Modified</b>	3/29/2010 4:18:08 PM
<b>Parent Name</b>	

Database Modification History Report (Reports>Internal Reports>DB Modification History)

## Exception Journal Report

The Exception Journal Report displays all AirVision Exception messages for the Date Range and Logging Type selected. Logging Types are selected from a drop-down list of the following: Unhandled, Nested, Rethrown, Asset, and Validation.

# Exception Journal Report

---

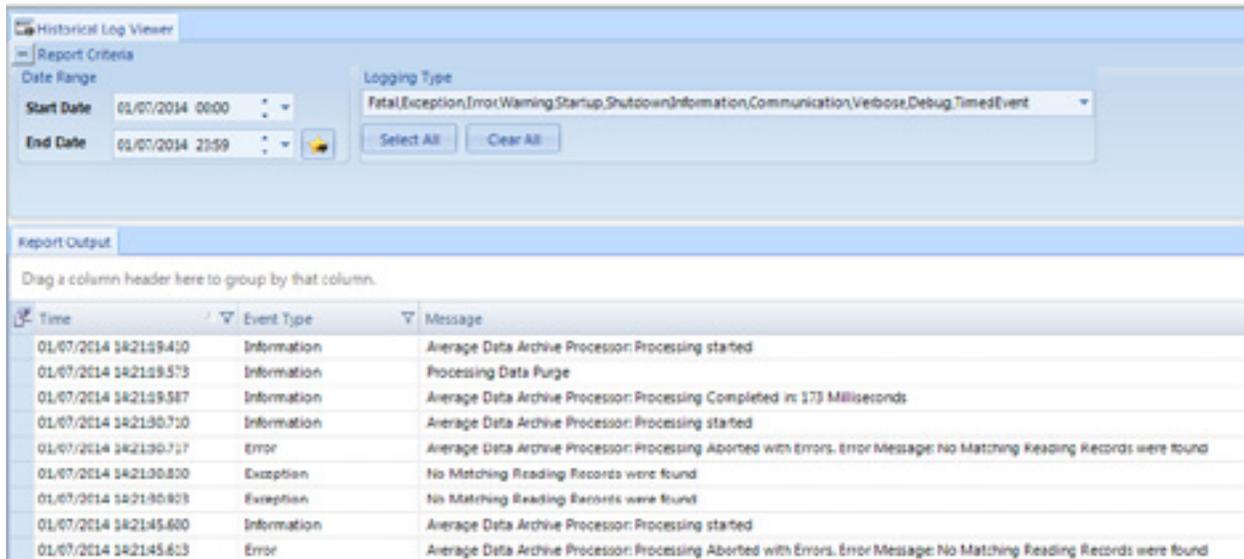
<b>Time Stamp</b>	<b>Exception Log Type</b>	<b>Exception Type Name</b>	<b>UtilityJournalMessageID</b>	
10/4/2010 11:03:13 AM	Nested	System.Net.Sockets.SocketException	a2142582-c8cf-df11-91b4-001731c6e8fb	
<b>Computer Name</b>	<b>Windows User</b>	<b>Application User</b>	<b>Program Name</b>	<b>Product Version</b>
HP_Server	SYSTEM	AirVision	AirVision.WindowsService	2010.09.18.1
<b>Assembly Name</b>	<b>Namespace</b>		<b>Type Name</b>	
System.dll	System.Net.Sockets		Socket	
<b>Method Prototype</b>				
Int32 Send(Byte[] buffer, Int32 offset, Int32 size, System.Net.Sockets.SocketFlags)				
<b>Exception Message</b>				
An established connection was aborted by the software in your host machine.				
<b>Exception Stack Trace</b>				
at System.Net.Sockets.Socket.Send(Byte[] buffer, Int32 offset, Int32 size, SocketFlags socketFlags)				
at System.Net.Sockets.NetworkStream.Write(Byte[] buffer, Int32 offset, Int32 size)				

---

<b>Time Stamp</b>	<b>Exception Log Type</b>	<b>Exception Type Name</b>	<b>UtilityJournalMessageID</b>	
10/4/2010 11:03:13 AM	Nested	System.IO.IOException	a3142582-c8cf-df11-91b4-001731c6e8fb	
<b>Computer Name</b>	<b>Windows User</b>	<b>Application User</b>	<b>Program Name</b>	<b>Product Version</b>
HP_Server	SYSTEM	AirVision	AirVision.WindowsService	2010.09.18.1
<b>Assembly Name</b>	<b>Namespace</b>		<b>Type Name</b>	
System.dll	System.Net.Sockets		NetworkStream	
<b>Method Prototype</b>				
Void Write(Byte[] buffer, Int32 offset, Int32 size)				
<b>Exception Message</b>				
Unable to write data to the transport connection: An established connection was aborted by the software in your host machine.				
<b>Exception Stack Trace</b>				
at System.Net.Sockets.NetworkStream.Write(Byte[] buffer, Int32 offset, Int32 size)				
at AirVision.Services.Communication.Communicators.TcpCommunicator.Write(String command)				

Exception Journal Report (Reports>Internal Reports>Exception Journal)

### Historical Log Viewer



Utilities->Log Viewer

### Journal Message Log

The Journal Message Log (**Reports > Internal Reports > Journal Message Log**) displays messages about selected Logging Types. Logging Types are displayed in a drop-down check list when you click the arrow in the Logging Type field. Type selections are: **Fatal, Exception, Error, Warning, Startup, Shutdown, Information, Communication, Verbose, Debug, Timed Event, or Select all.**

- **Note:** To log detailed information about a specific (problematic) Logging Type or Types, select that Logging Type in addition to Verbose from the drop-down menu before you generate the Journal Message Report.

### Journal Message Report

Time Stamp	Computer Name	Program Name	Event Log Type	Message Text
09/28/2010 10:02:39667	HP_Server	AirVision.Client	Exception	No connection could be made because the target machine actively refused it 172.16.1.109:5085
09/28/2010 10:03:38930	HP_Server	AirVision.WindowsService	Information	Login Request [SYSTEM], User*, ClientIP=HP_Server.172.16.1.109
09/28/2010 10:03:39513	HP_Server	AirVision.WindowsService	Information	LOGIN SUCCESSFUL [SYSTEM], User=AirVision, ClientIP=HP_Server.172.16.1.109, SessionID=95e364f9-a15e-48e7-b6f9-52f4f902918f, UserID=3056439d-42f3-d4d1-9b07-802e0c095352
09/28/2010 10:03:43873	HP_Server	AirVision.WindowsService	Information	Found 0 root level tasks
09/28/2010 10:03:50043	HP_Server	AirVision.WindowsService	Information	Login Request [USER], User=airvision, ClientIP=HP_Server.172.16.1.109
09/28/2010 10:03:50060	HP_Server	AirVision.WindowsService	Information	LOGIN SUCCESSFUL [USER], User=AirVision, ClientIP=HP_Server.172.16.1.109, SessionID=1d34b-059-4e3b-4f82-5012-82b0f0e6a53d, UserID=3056439d-42f3-d4d1-9b07-802e0c095352

Journal Message Log (Reports > Internal Reports > Journal Message Log)

## Software Version Report

The Software Version Report (**Reports>Internal Reports >Software Version Report**) displays Timestamps for Database Schema and Software Builds, Version IDs, and Software Version.

The Software Version Report is primarily used for troubleshooting in the event of unusual software behavior.

Software Version Report	
<b>Database Schema Timestamp</b>	7/23/2010 3:14:16 PM
<b>Database Schema Version Id</b>	19d9b0d3-79b3-4401-ad5c-eda98399a07e
<b>Database Schema Version Number</b>	4058
<b>Client Database Schema Timestamp</b>	5/3/2010 1:01:22 PM
<b>Client Database Schema Version Id</b>	a6397b90-8a18-4ea5-8b05-954bc3d6d06
<b>Client Database Schema Version Number</b>	4004
<b>Client Build Timestamp</b>	6/26/2010 3:03:44 AM
<b>Client Build Version</b>	2010.0626.1
<b>Client Product Version</b>	2.0.0 Alpha
<b>Server Database Schema Timestamp</b>	6/3/2010 1:01:22 PM
<b>Server Database Schema Version Id</b>	a6397b90-8a18-4ea5-8b05-954bc3d6d06
<b>Server Database Schema Version Number</b>	4004
<b>Server Build Timestamp</b>	6/26/2010 3:02:00 AM
<b>Server Build Version</b>	2010.0626.1
<b>Server Product Version</b>	2.0.0 Alpha

Software Version Report (Reports>Internal Reports)

Table Size Information

The Table Size Information Report lists all tables in the database and their size.

### *Table Size Information Report*

<i>Table Name</i>	<i>Rows</i>	<i>Reserved (K)</i>	<i>Data (K)</i>	<i>Index Size (K)</i>	<i>Unused (K)</i>
All Tables	24,400	29,160	24,288	4,280	592
AdvpCharacteristicRelation	12	32	8	24	0
AdvpDataCharacteristic	4	32	8	24	0
AdvpHistoricalAverage	0	0	0	0	0
AdvpLogicalJoinOperator	2	32	8	24	0
AdvpRuleCondition	0	0	0	0	0
AdvpRuleStatus	0	0	0	0	0
AdvpRuleStatusSite	0	0	0	0	0
AdvpValueComparisonType	4	32	8	24	0
AlarmAdvpParameter	0	0	0	0	0
AlarmAdvpRule	0	0	0	0	0
AlarmAdvpTask	0	0	0	0	0
AlarmTriggerFlag	0	0	0	0	0
AmbAirNowFlagDetail	6	16	8	8	0
AmbAirNowTask	0	0	0	0	0
AmbAqiLevel	63	88	56	32	0
AmbAqiProgram	10	32	8	24	0
AmbAqsBlankType	3	32	8	24	0
AmbAqsCompositeType	5	32	8	24	0
AmbAqsCountyTribalCode	3,376	784	504	248	32
AmbAqsDurationCode	23	32	8	24	0
AmbAqsFrequencyCode	31	32	8	24	0
AmbAqsNullCode	52	64	16	48	0
AmbAqsParameterCategory	4	32	8	24	0
AmbAqsParameterType	1,065	320	240	72	8
AmbAqsStateCode	57	48	8	40	0
AmbAqsUnitCode	124	56	24	32	0
AmbFrequencyDistribRange	0	0	0	0	0
AmbFrequencyDistribution	0	0	0	0	0
AmbFtpTransfer	0	0	0	0	0
AmbVosProgram	0	0	0	0	0
AmbWindRoseLevel	16	16	8	8	0
AmbWindRoseProgram	2	32	8	24	0

Table Report (Reports>Internal Reports)

## Logger Reports

The Logger Reports folder in the Reports menu contains the following reports:

- ◆ Alarm Journal
- ◆ Input Line Status Report
- ◆ Power Failure Report

### Alarm Journal

The Alarm Journal displays the Site Name, Channel Number, Channel Name, Alarm Program Name, Alarm Start/End Time, Reason Code, and Triggering Flag.

To run an Alarm Journal, select **Reports > Logger Reports > Alarm Journal**. In the Report Criteria screen, select a Start/End Date and a Site/ Source Name. Click the **Generate Report** icon. A Logger Alarm Journal Report will be displayed in the bottom section of the screen.

---

## Logger Alarm Journal Report

---

Site Name SITEONE

Channel Number	Channel Name	Alarm Program Name	Alarm Start Time	Alarm End Time	Reason Code	Flag Triggering
2	tsu2	TEMP00T	2/12/2008 6:08:00 AM	2/12/2008 8:40:00 AM		h
2	tsu2	TEMP00T	2/12/2008 8:27:00 AM	2/12/2008 8:36:00 AM		h
2	tsu2	TEMP00T	2/12/2008 8:37:00 AM	2/12/2008 8:40:00 AM		h
2	tsu2	TEMP00T	2/12/2008 8:42:00 AM	2/12/2008 8:50:00 AM		h
2	tsu2	TEMP00T	2/12/2008 8:49:00 AM	2/12/2008 7:05:00 AM		h
2	tsu2	TEMP00T	2/12/2008 2:37:00 PM	2/12/2008 4:12:00 PM		h
2	tsu2	TEMP00T	2/12/2008 8:34:00 PM	2/12/2008 9:50:00 PM		h

Logger Alarm Journal Report

### Input Line Status Report

The Input Line Status Report displays Site and Logger Name, Logger ID, Line Number Line Name, Line State, Time of Change, and Line Description.

To run an Input Line Status Report, select **Reports > Logger Reports > Input Line Status Report**. In the Report Criteria screen, select a Start/End Date and a Site/ Source Name. Click the **Generate Report** icon. An Input Line Status Report will be displayed in the bottom section of the screen. Each site/logger is shown in a separate page.

## Input Line Report

Site Name SITEONE

Logger Name Logger01

Logger Identifier 01

Line Number	Line Name	Line State	Time Of Change	Line Description
4	OutPut Line4	<input checked="" type="checkbox"/>	2/5/2009 1:38:45 PM	
4	OutPut Line4	<input type="checkbox"/>	2/5/2009 1:38:46 PM	
37	OutPut Line37	<input checked="" type="checkbox"/>	5/5/2009 12:00:02 AM	
37	OutPut Line37	<input type="checkbox"/>	5/5/2009 12:05:01 AM	
37	OutPut Line37	<input checked="" type="checkbox"/>	5/6/2009 12:00:02 AM	
2	DIG002	<input checked="" type="checkbox"/>	5/6/2009 12:00:02 AM	
2	DIG002	<input type="checkbox"/>	5/6/2009 12:05:01 AM	
37	OutPut Line37	<input type="checkbox"/>	5/6/2009 12:05:01 AM	
37	OutPut Line37	<input checked="" type="checkbox"/>	5/7/2009 12:00:02 AM	
2	DIG002	<input checked="" type="checkbox"/>	5/7/2009 12:00:02 AM	
2	DIG002	<input type="checkbox"/>	5/7/2009 12:05:01 AM	
37	OutPut Line37	<input type="checkbox"/>	5/7/2009 12:05:01 AM	
37	OutPut Line37	<input checked="" type="checkbox"/>	5/8/2009 12:00:02 AM	
2	DIG002	<input checked="" type="checkbox"/>	5/8/2009 12:00:02 AM	
2	DIG002	<input type="checkbox"/>	5/8/2009 12:05:01 AM	
37	OutPut Line37	<input type="checkbox"/>	5/8/2009 12:05:01 AM	

Input Line Report

### Power Failure Report

The Power Failure Report displays Site and Logger Name, Logger ID, Failure Time and Restored Time.

To run a Power Failure Report, select **Reports > Logger Reports > Power Failure Report**. In the Report Criteria screen, select a **Start/End Date** and a **Site/ Source Name**. Click the **Generate Report** icon. A Power Failure Report will be displayed in the bottom section of the screen. Each site/logger is shown in a separate page.

---

## *Logger Power Failure Report*

---

<i>Site Name</i> SITEONE	<i>Site Description</i> SITE 01
--------------------------	---------------------------------

<i>Logger Name</i> Logger01	<i>Logger Identifier</i> 01
-----------------------------	-----------------------------

	<u><i>Failure Time</i></u>	<u><i>Restored Time</i></u>
	11/25/2007 12:00:00 AM	11/25/2007 12:01:00 AM
	11/25/2007 12:01:00 AM	11/25/2007 12:01:00 AM
	7/2/2008 10:56:00 AM	7/2/2008 10:56:00 AM

---

Power Failure Report

## Other Reports

### Annotations Report

The Annotations report may be run on any list of parameters, for any time range. It provides a summary of all annotations it finds.

To see a report of annotations made in the Average Data Editor, open the Reports menu and select Annotations Report. Make the usual query selections of **Start/End Date**, **Average Interval**, and **Parameter(s)**. Click the **Generate Report** icon on the ribbon.

Current Date : 9/28/2010  
 Current Time : 9:10 PM

Annotation Report  
 01-Mar-2006 00:00 to 06-Mar-2006 00:00

Site: Roane\_Y  
 Parameter: 02\_SO2

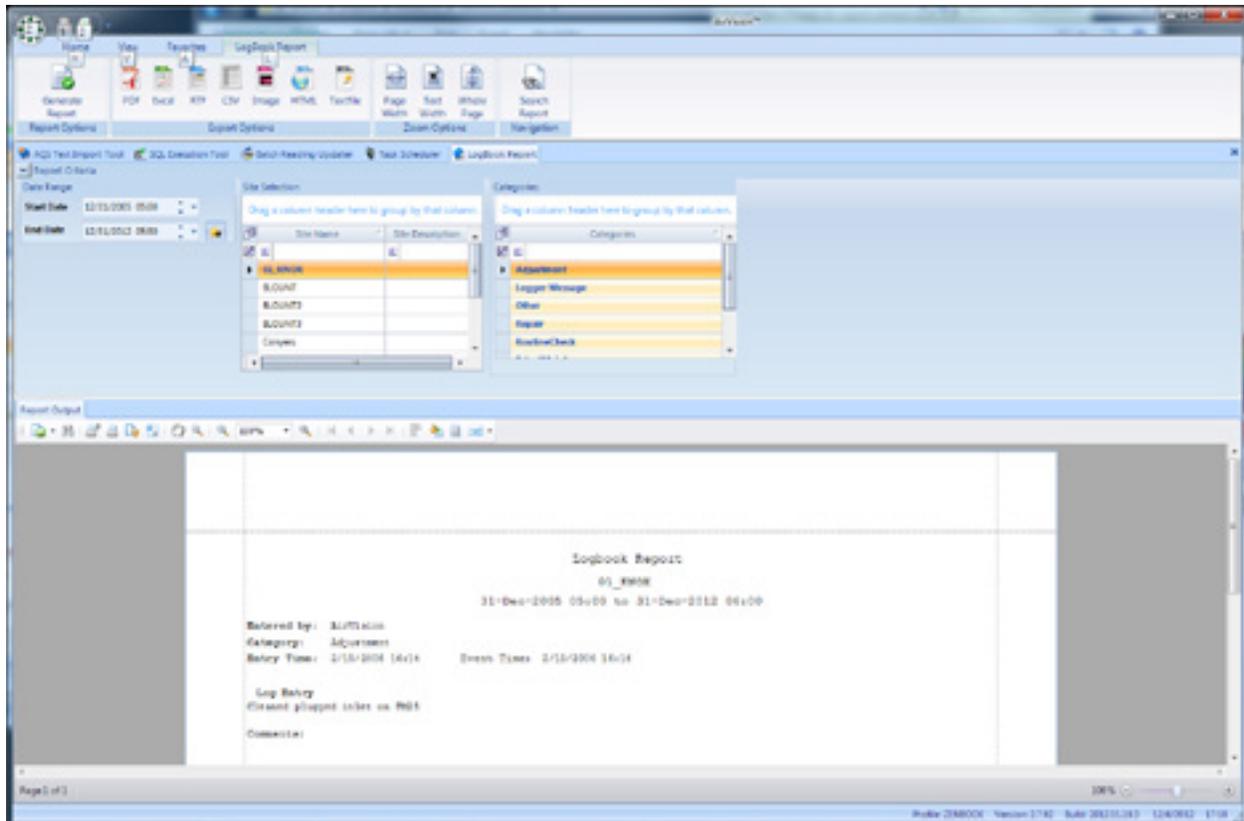
<u>Category</u>	<u>User Name</u>	<u>Annotation Date</u>	<u>Date</u>	<u>Annotation</u>
Instrument Failure	Admin	28-Sep-10 21:10	01-Mar-06 20:00	Lightning strike
Maintenance	New User	28-Sep-10 21:09	01-Mar-06 05:00	Replaced pump seal
Maintenance	New User	28-Sep-10 21:09	01-Mar-06 06:00	Replaced pump seal
QA Note	Fred5	28-Sep-10 21:09	01-Mar-06 09:00	Quarterly Audit
QA Note	Fred5	28-Sep-10 21:09	01-Mar-06 10:00	Quarterly Audit
QA Note	Fred5	28-Sep-10 21:09	01-Mar-06 11:00	Quarterly Audit

Annotations Report

## LogBook Report

The LogBook Report generates reports of logbook entries that were made in the LogBook Entries Editor. To query a LogBook Report select LogBook Report from the Reports menu. Select **Start** and **End Dates** and a **Site Name** from the top section of the screen and click the **Generate Report** icon in the upper left section of the screen. The user may also choose one or all Logbook Categories as a filter for the report.

The logbook report will be displayed in the lower section of the screen



LogBook Report

# Data Editors

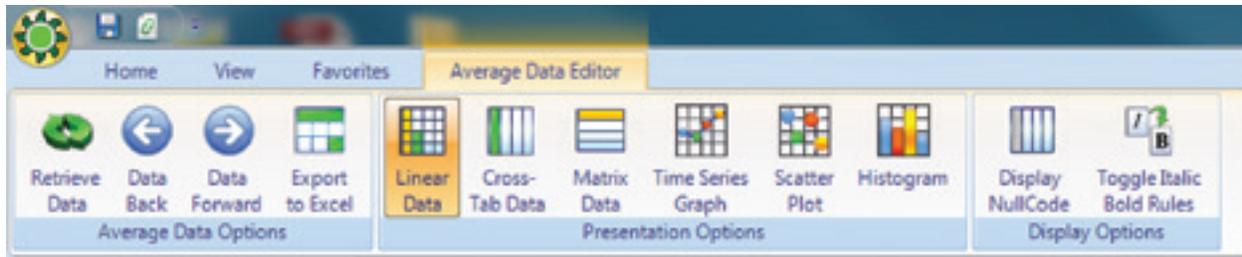
### *Average Data Editor*

The 8872 Average Data Editor (**Data Editors > Average Data Editor**) combines multiple functions into a single tool:

- ◆ Editing data point details
- ◆ Batch editing
- ◆ Comparison of current data with historical minimum, maximum, and mean
- ◆ Analyze/Exported

In addition, you can toggle between the following six formats by clicking buttons in the ribbon at the top of the screen:

- ◆ Linear Table (the default display)
- ◆ Cross-Tab Table
- ◆ Matrix Table
- ◆ Time Series Graph (can be used for single or multiple parameters, but the historical comparison tools in this X-Y scatter plot only appear in single-parameter queries)
- ◆ Scatter Plot graph (requires queries of two or more parameters)
- ◆ Histogram (for single parameter queries)



Ribbon bar to toggle between Data Editor displays; arrows to scroll backward and forward through data

Control-Keys can also be helpful for navigating when using the editor:

- ◆ **CTRL-N** for Next (Data Forward)
- ◆ **CTRL-P** for Previous (Data Back)
- ◆ **CTRL-L** to Reload data set.

To edit data in the Average Data Editor (**Data Editors > Average Data Editor**), enter

- ◆ **Start and End Date** (type dates or use arrow keys to select)
- ◆ **Average Interval** (for example, 001h Hourly average of 60 minutes)
- ◆ **Parameter Selection** (for example, Site Name NKNOX, Parameter Name NO2, Parameter Template NO2)
- ◆ Click the **Retrieve Data** button in the ribbon at the top of the screen

The Average Data Editor will open the Linear Data Editor by default. Click buttons in the ribbon to change formats.

## Linear Data Editor

### The Linear Data Editor

- ◆ Site Name, Parameter Name, Parameter Template Name
- ◆ Average Interval
- ◆ Start and End Dates
- ◆ Value (Hover the mouse pointer over data values to see any annotations.)
- ◆ Raw Value (can't be edited)
- ◆ AQS Null Codes
- ◆ Data Logger Flags
- ◆ Qualifier Codes
- ◆ Data Grade (used by ADVP).

To edit data values, double-click in the Value cell or right-click to bring up a pop-up menu.

Site	Parameter	Average Interval	Date	Value	Raw Value	AQS Null Code	Flags	Qualifier Codes	Data Grade	AQS Method Code
Aglaire	OZONE	003h	04/25/2000 14:00	0.458	0.458100007					123
Aglaire	OZONE	003h	04/25/2000 15:00	<b>0.851</b>	0.155209123		> 7E			123
Aglaire	OZONE	003h	04/25/2000 16:00	0.345	0.144879432					123
Aglaire	OZONE	003h	04/25/2000 17:00	0.261	0.200952009					123
Aglaire	OZONE	003h	04/25/2000 18:00	0.405	0.434747044					123
Aglaire	OZONE	003h	04/25/2000 19:00	0.374	0.373627042					123

Average Data Editor from Data Editors menu

## Cell Color Codes

All data is color-coded based on the flag-to-color mappings listed in the Flags Editor. The Model 8872 is loaded with some default mappings, but you can customize this for your system. The color mappings are global to all users for consistency.

In addition, the 8872 uses two font changes to represent data in the data editor:

- ◆ **Bold** values represent data that does not match the raw database (edited values), or has a flag attached to it.
- ◆ *Italics* values represent data that has an annotation. Hover the mouse pointer over data values to see details of annotations.

## Right-Click Options

Each of the three non-graphical data editors support select, shift-select, CTRL-select, click-drag selection capabilities, and a right-click menu options. Right-click a data point in the Value column to bring up the following menu:

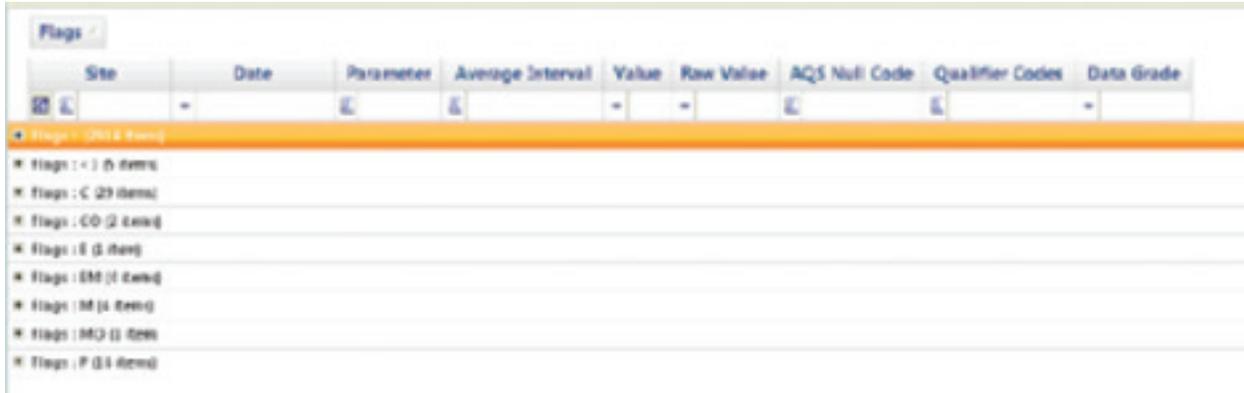
- ◆ **Restore from Raw** copies value from the raw database to the final Value and resets flags.
- ◆ **Set to Minimum Detectable Limit** sets data value to MDL configured in Parameter Editor.
- ◆ **Set AQS Code** brings up a pick list to apply new AQS null codes.
- ◆ **Set Qualifier Code** brings up a selection box for AQS qualifier (exception) codes.
- ◆ **View All Flags** (for single data points only) shows all data logger and system flags and allows you to change or clear flags. Multiple flags can be displayed in each cell.
- ◆ **Set Annotations** brings up an annotation screen so you can add an annotation.
- ◆ **Batch Edit** allows you to scale two or more selected data values as  $mX+b$  (Original Value times a Multiplier plus a Constant Value), for example, divide by 10 and clear the suspect flag.
  1. First, you must select **Enabled**.
  2. You have the option to combine scaling with one or more of the following: **Update Values**, **Set Annotations**, **Set AQS Code**, **Set Qualifier Code**, and **Set Flags**.
  3. If you select **Set Flags**, you will have the option to **Update Children Flags**.
- ◆ **Show Children** brings up another instance of the Data Editor with the selected parameters and time range for the Child parameter(s) of the selected parameter. This function requires that Parent-Child Parameter relationships are configured in **Configuration Editors > Parameter Settings**.
- ◆ **Drill Down Interval** allows you to drill down to minute averages from hourly averages.
- ◆ **Export to Excel** exports the selected data range to an Excel document, including color, font, and layout details. This right-click option is different from the Export to Excel button in the ribbon at the top of the screen because the button on the ribbon exports the entire data set in the data editor and the right-click option exports only selected data.

Click a column heading to sort data by a different heading, for example to group data according to flags. Default is to sort by date.

Click-hold-drag columns to change the order of columns or to drag a column heading to the **Drag a column header here to group by that column** area.

## Cross-Tab Data Editor

The Cross-Tab Data Editor shows parameters as columns and date/time as rows and provides the same right-click menu as the Linear Data Editor.



Cross-Tab Data Editor from Data Editors menu

- ▶ **Note:** You can sort data by any column by clicking on a column header. You can find all flagged data easily, for example data grouped by data logger flag. Each group can then be expanded and individually sorted. When you change editor modes, the groupings are not kept. Also, you can click-hold-and-drag columns to change the order, and click-drag columns to the **Drag a column header here to group** area to group data. If you do this accidentally or change your mind, you can drag it back.

### Matrix Data Editor

The Matrix Data Editor presents data in a format similar to the monthly report. If you select multiple parameters, they are grouped with a plus (+) symbol for expansion.

Site	Parameter	Interval
NKnox	SO2	001h

DateOnly	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	1
07/30/2009	52.751	52.730	52.684	52.629	52.570	52.500	52.433	52.346	52.130	52.281	52.322	52.414	52.779	53.105	53.033	52.975	51
07/31/2009	52.280	52.252	52.222	52.167	52.086	52.011	51.965	52.030									

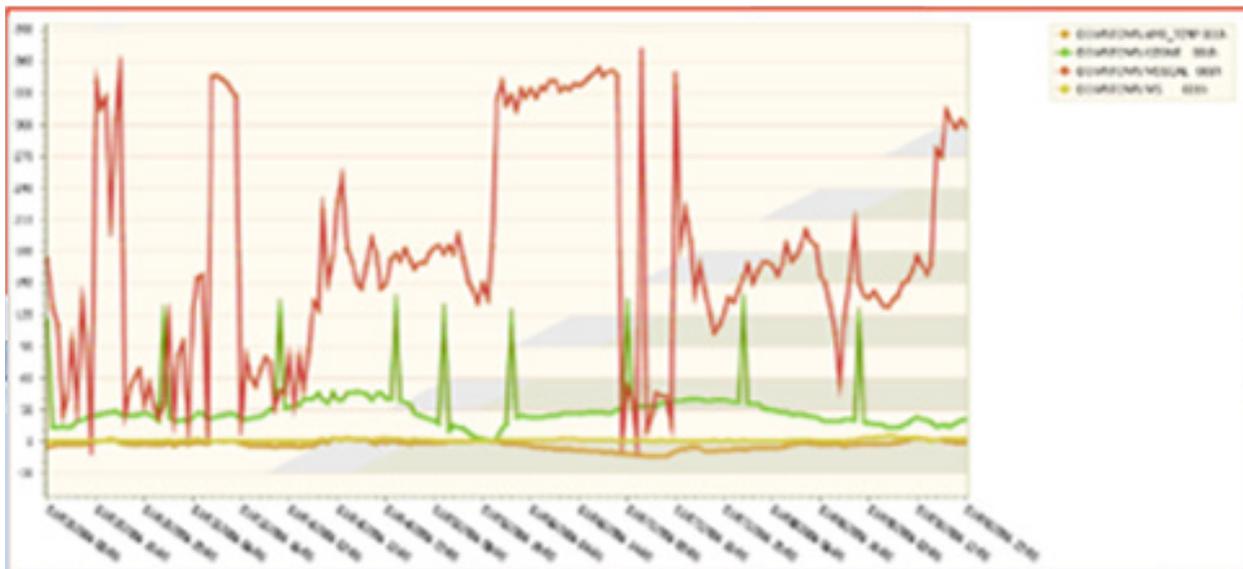
Site	Parameter	Interval
NKnox	OZONE	001h
NKnox	NO2	001h

Matrix Data Editor from Data Editors menu

### Time Series Graph

You can generate the Time Series Graph in two modes, for one or more parameters. In multi-parameter mode, you can group different parameters together for any time period. With the tools at the bottom of the screen, you can change the color scheme, remove or restore the legend, and print the graph.

The minus (-) sign in the upper left corner of the screen minimizes the selection criteria to make more room for the graph.



Time Series from Data Editors menu with multiple parameters selected

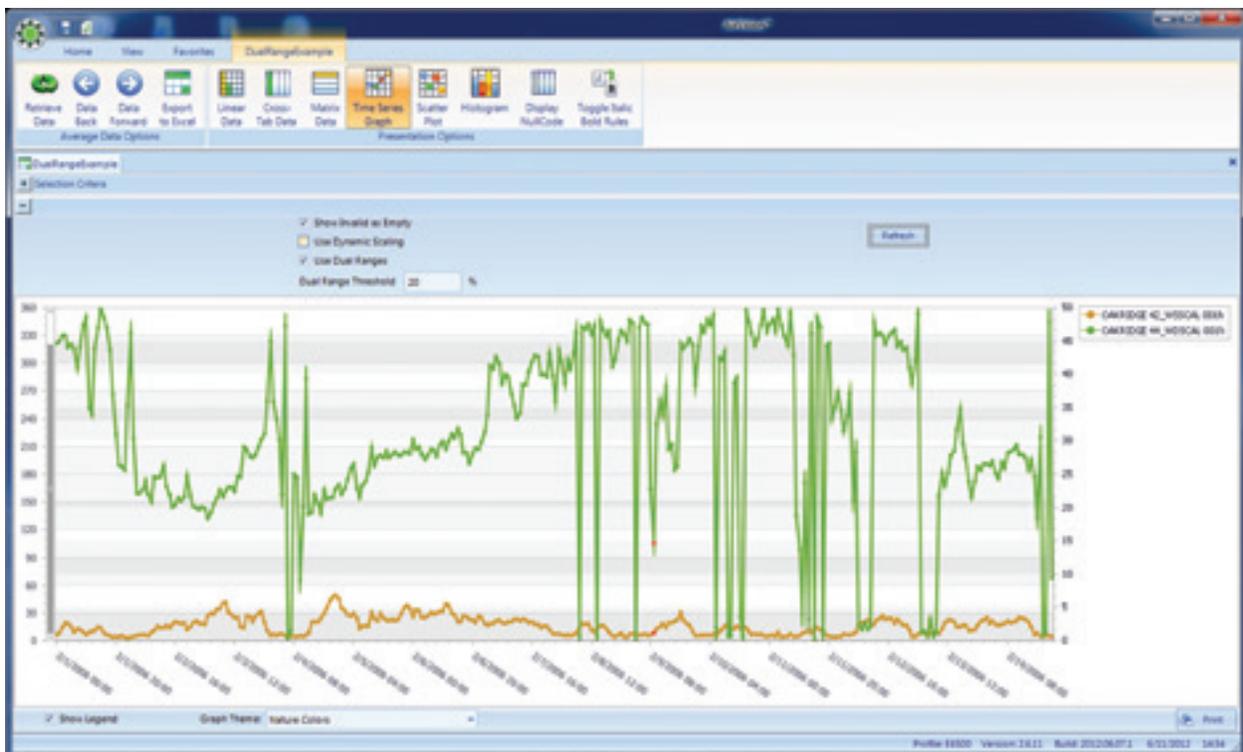
Use the mouse scroll wheel to zoom in or out; right-click and hold to drag the zoomed graph to a different data area.

Hover the cursor over a data point to see the specific date, time, and data value. If there is a flag on the data point the flag will also be displayed.

You can toggle between hiding or showing invalid data (e.g., data during calibration, maintenance, or analyzer failures).

When graphing parameters with two dramatically different full scale ranges, you may choose to use the "Dual Y-Axis Scale" option. When choosing this option, you must also choose the percentage (e.g., 10%, 20%) of the full scale range that is used as the 'breakpoint' for the secondary Y-axis. A value of 20% is common. Note that this function requires that Graph Maximum and Graph Minimum be set in the Parameter configuration. Graphs that have any parameters without limits configured cannot use the Dual Y-Axis function.

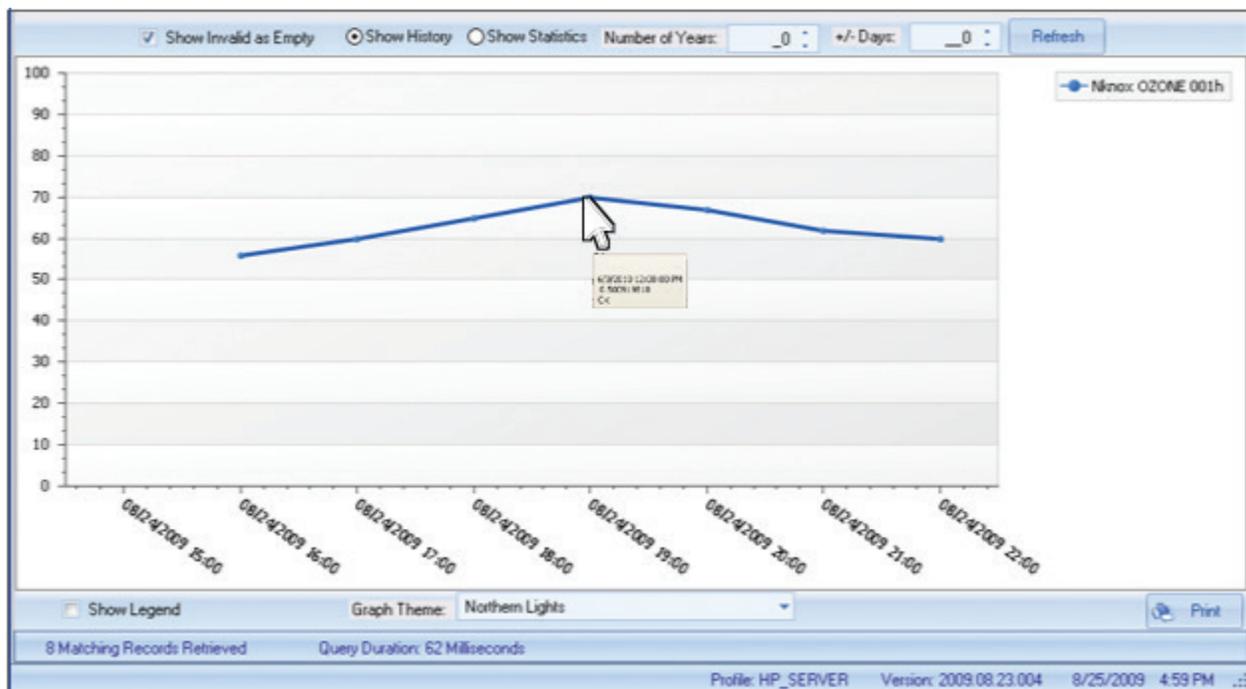
**Suppress Flag Colors** - If not selected, flagged data will be shown with "dots" with colors based on the Flag configuration. If selected, data will just be shown as the trend graph color. In both cases, hovering the cursor over the point will always show the flag, and the flag colors are still represented in the tabular/grid display.



Dual Y-Axis function

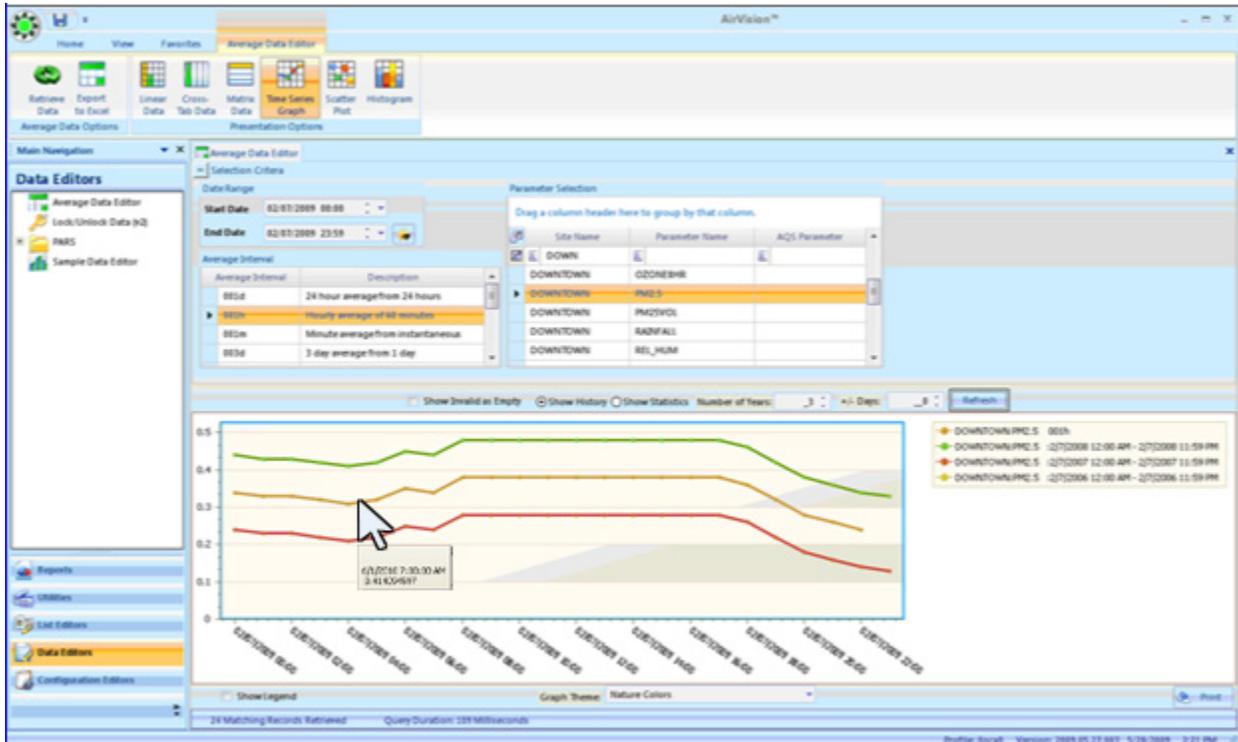
For one parameter, you can choose previous intervals to be other than one year by selecting **Show History** from the options above the graph. If you bring up the Time Series Graph in single parameter mode, you get additional options at the top of the graph:

- ◆ Show History displays N previous years of data alongside main graph
- ◆ Show Statistics displays cumulative statistics of N previous years--min, max, avg
- ◆ Number of Years
- ◆ +/- Days allows rolling average of additional days in historical statistics
- ◆ Refresh



Time Series Graph with a single parameter selected and hover over displaying date, time data value, and flag

If the database contains data from previous years for the same parameter, those previous years can be graphed in the Time Series Graph alongside the current data by selecting **Show History** and the number of years you want to graph. Each previous year is graphed individually. Select **Refresh** to update the graph.



Time Series Graph with a single parameter and Show History option and hover over displaying date, and time data value

The “+/- Days” selector can be used to compile nearby days for the same hour into the comparison statistics. An example of how this is applied would be:

Current Data = 1/15/09,. Number of Years = 3, +/- Days = 1

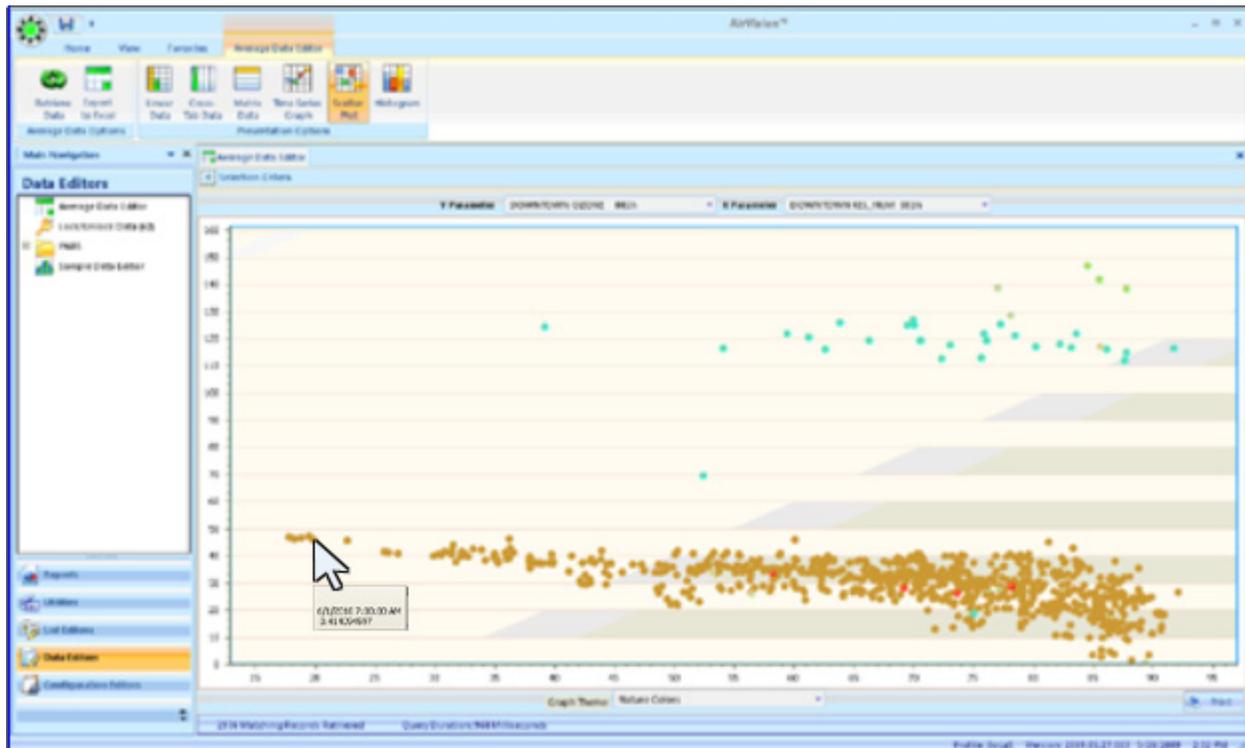
1/5/09 data at hour 00 would be compared against statistics using the following points:

- 1/4/06, hour 00
- 1/5/06, hour 00
- 1/6/06, hour 00
- 1/4/07, hour 00
- 1/5/07, hour 00
- 1/6/07, hour 00
- 1/4/08, hour 00
- 1/5/08, hour 00
- 1/6/08, hour 00

Obviously, selection of a large data set with a long look back period and large skews can be very processor intensive for the client and the SQL server for large data sets. Agilaire recommends this tool be used for data sets of roughly a week or less.

## Scatter Plot Graph

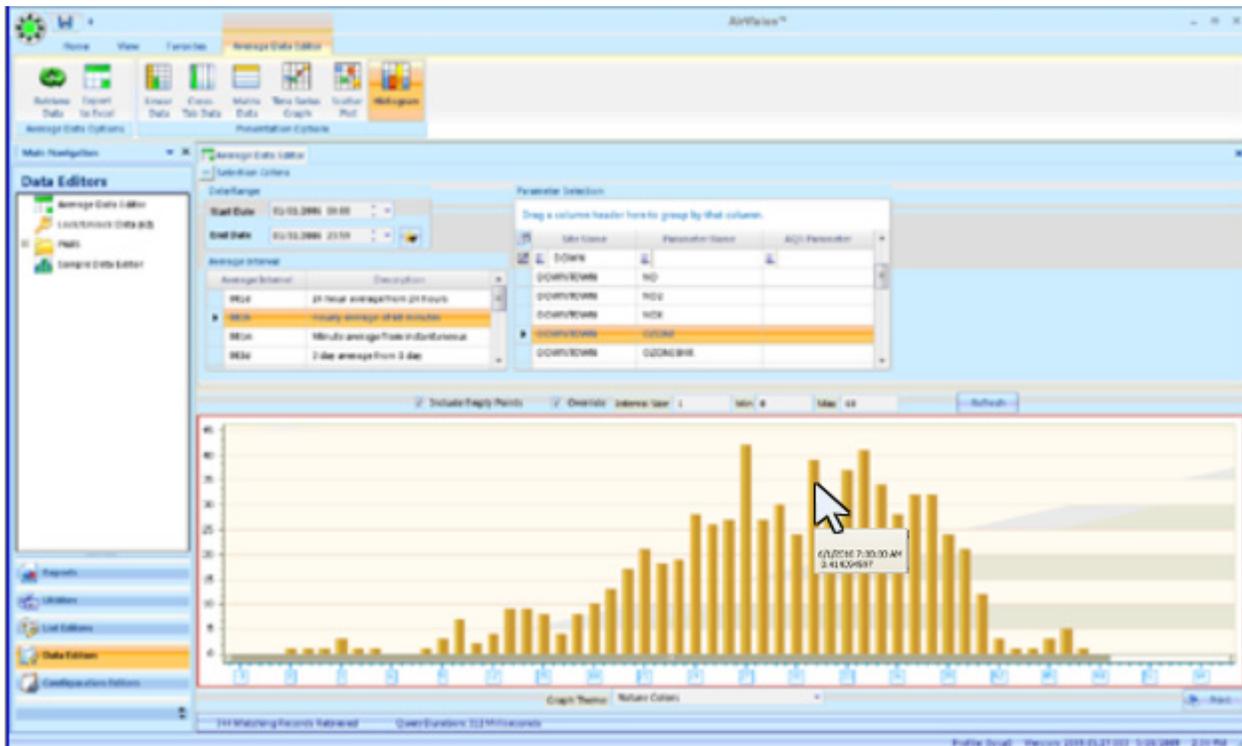
The Scatter Plot Graph allows any two parameters in the existing chart to be plotted in an X-Y chart. The Y axis parameter is the primary parameter and all data points are color coded according to the Data Flags color mappings to help distinguish outliers that have already been flagged.



Scatter Plot Graph from Data Editors menu with hover over displaying date, time and data value

## Histogram

The Histogram provides a graph of the distribution of values for the entire data set, but it is designed to display only one parameter at a time, so be careful not to use multiple parameters. The default graph uses the graph maximum/minimum from **Configuration Editors > Parameter Settings**, but you can check **Override** to set a custom max/min specifically for the X axis of this graph.



Histogram from Data Editors menu with hover over displaying date, time and data value

## LogBook Entry Editor

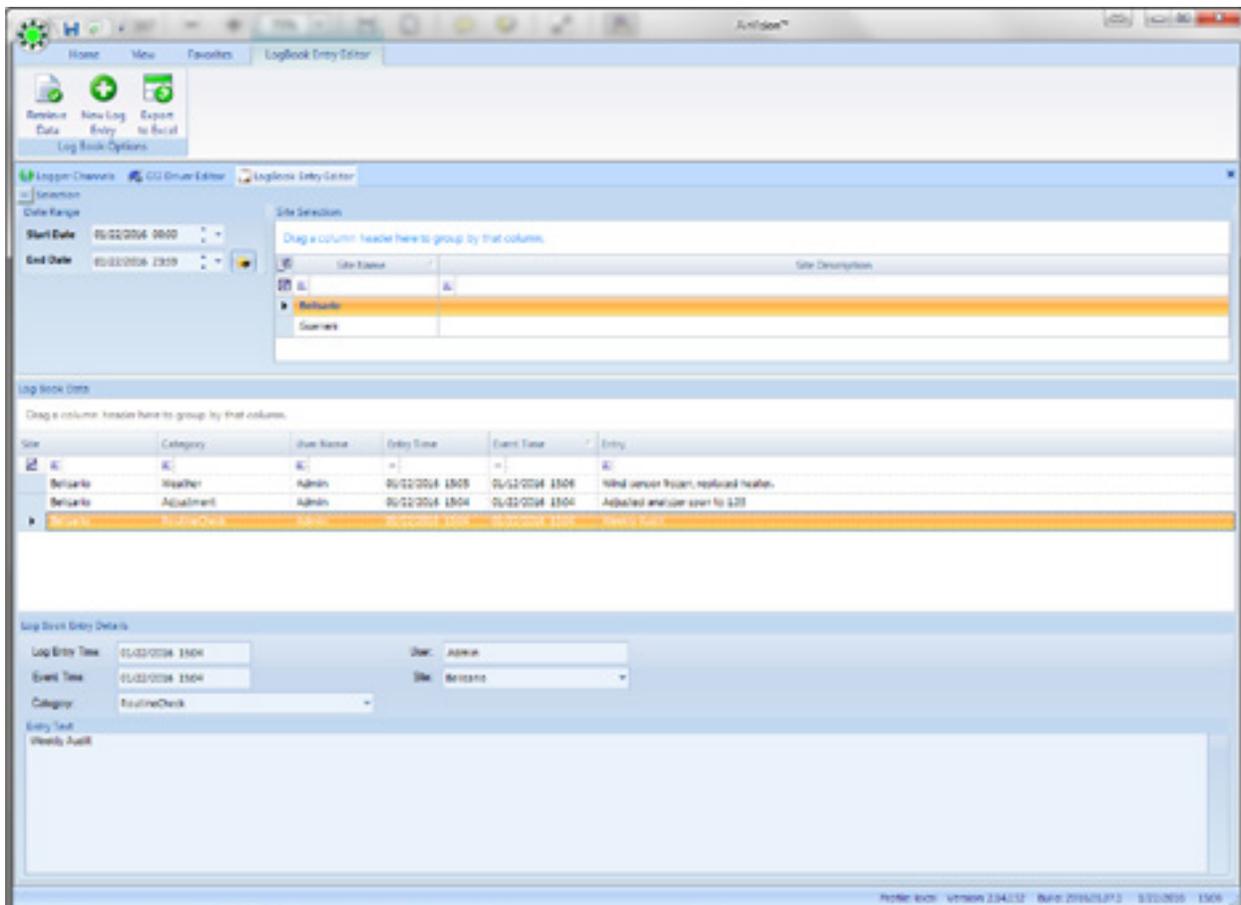
The LogBook Entry Editor allows you to make entries in a logbook that can then be seen in LogBook Reports. To make a logbook entry, open **LogBook Entry Editor** from the **Editors** menu.

Click the **New Log Entry** button in the upper left corner of the screen

In the bottom section of the screen enter a **Log Entry Time**, **User Entry Time**, select a **Category** from the drop-down list or select **New Category** and enter a different category, select a **User** and a **Site** from the drop-down lists

Enter the LogBook message in the **Entry Text** box and click **Save**.

The new entry information will be displayed in a row in the top section of the screen.



Adding LogBook entries in the LogBook Entry Editor from the Editors menu

By default, the logbook entries do not accept changes or addendums after the record has been saved. A system option is available to allow addendums to be made. To enable this, contact [support@agilaire.com](mailto:support@agilaire.com).

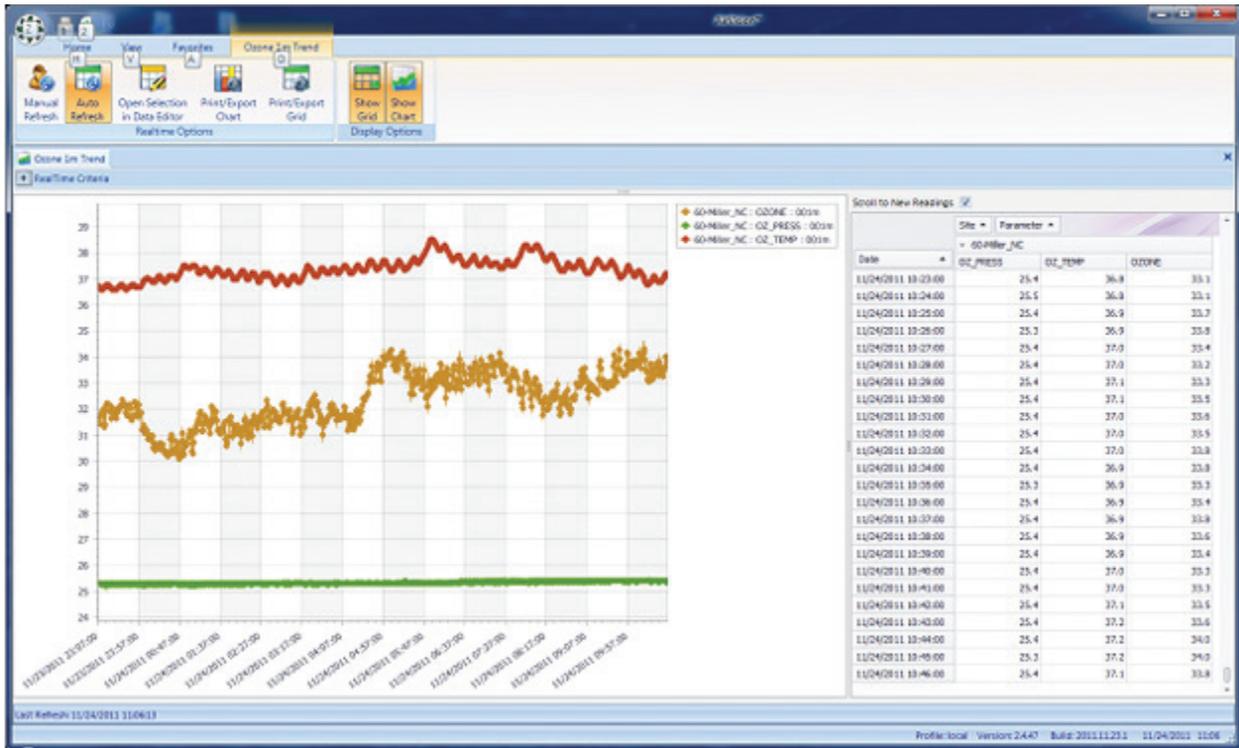
## Chapter 6

# Realtime Display Programs

The Model 8872 has three main realtime display programs to keep you informed of the realtime status of the readings, calibrations, I/O status, and averages:

- ◆ **Realtime Trend** is the same display used by AV-Trend to provide strip-chart like trends and basic tabular displays.
- ◆ **Tabular Display** provides a series of LED-like displays, which can be zoomed in to time-series charts. This display is very useful for mixing of multiple display averages (instantaneous, minute, hourly, etc) on the same page.
- ◆ **Site Node Logger Tool Box** is a blend of three tools:
  - ◆ **Readings** – current readings, and buttons to control / display maintenance or offline status of the channels; used to mark channels online/offline, or in/out of maintenance.
  - ◆ **Calibration** – shows the current status of calibrations, and allows you to start or abort a calibration program.
  - ◆ **Digital I/O** – show the current status of all physical or remote (Modbus) digital input/output points.

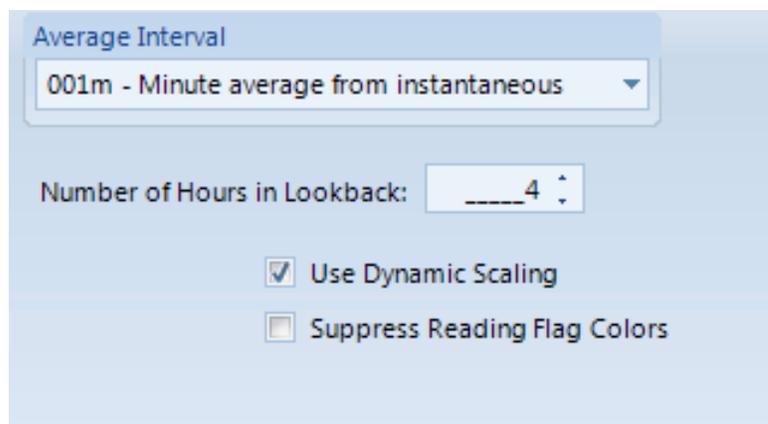
# Realtime Trend Display



Realtime Graph in Status Displays>RealTime DataTrending Graph, showing both Chart and Grid

In the graph criteria, the user may select several customizations:

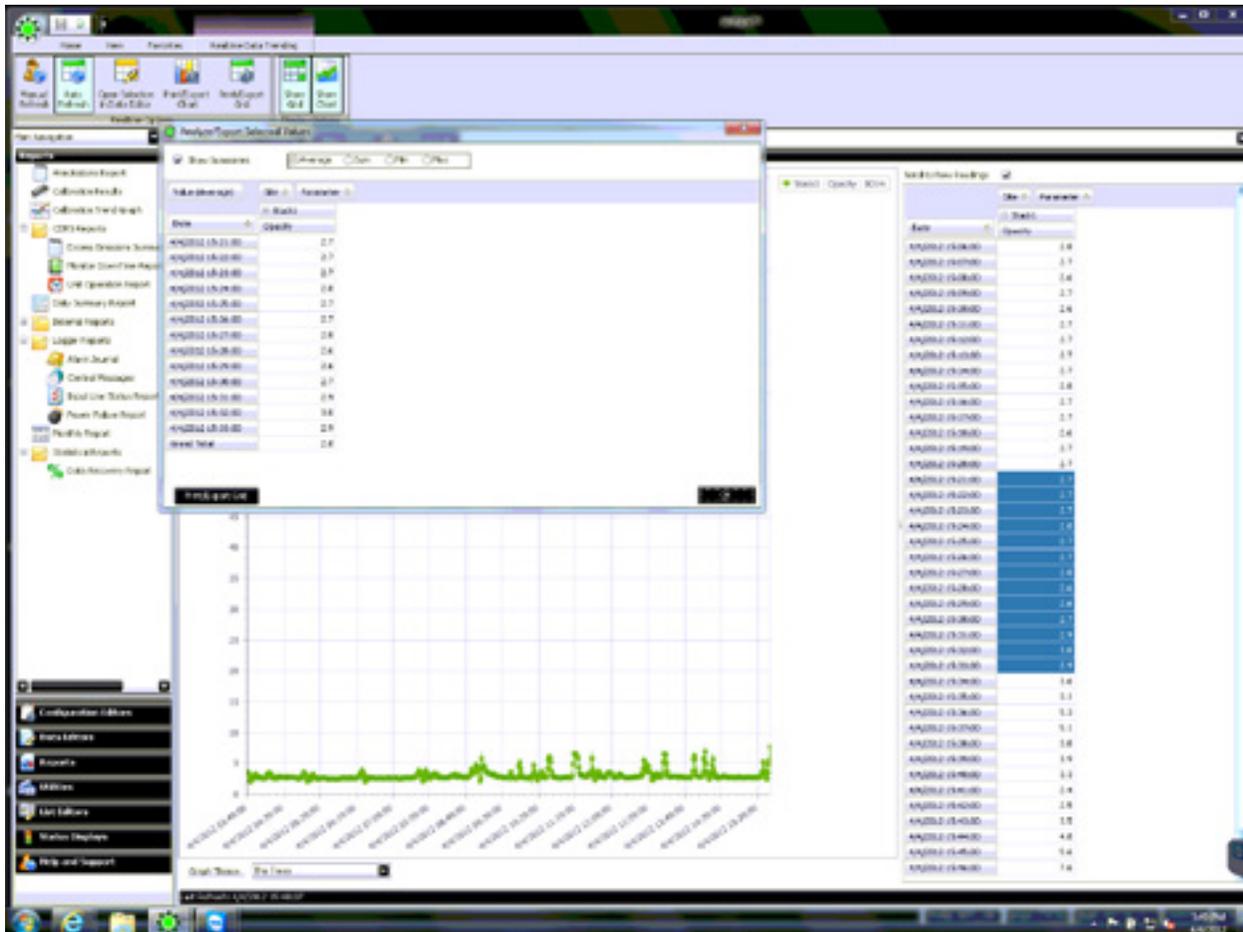
- ◆ **Number of Hours in Lookback** - This allows the user to dynamically define the width of the graph. After changing, the user should select “Manual Refresh” from the ribbon to take effect. This preference is stored with any Favorite created.



- ◆ **Use Dynamic Scaling** - If selected, the data graph min/max is set based on the range of data, rather than the graph min/max configured in the Parameter settings editor.
- ◆ **Suppress Flag Colors** - If not selected, flagged data will be shown with “dots” with colors based on the Flag configuration. If selected, data will just be shown as the trend graph color. In both cases, hovering the cursor over the point will always show the flag, and the flag colors are still represented in the tabular/grid display.

Within the Real-Time Trend, the user may drag-select and right-click a list of data points. The user is then presented with two options:

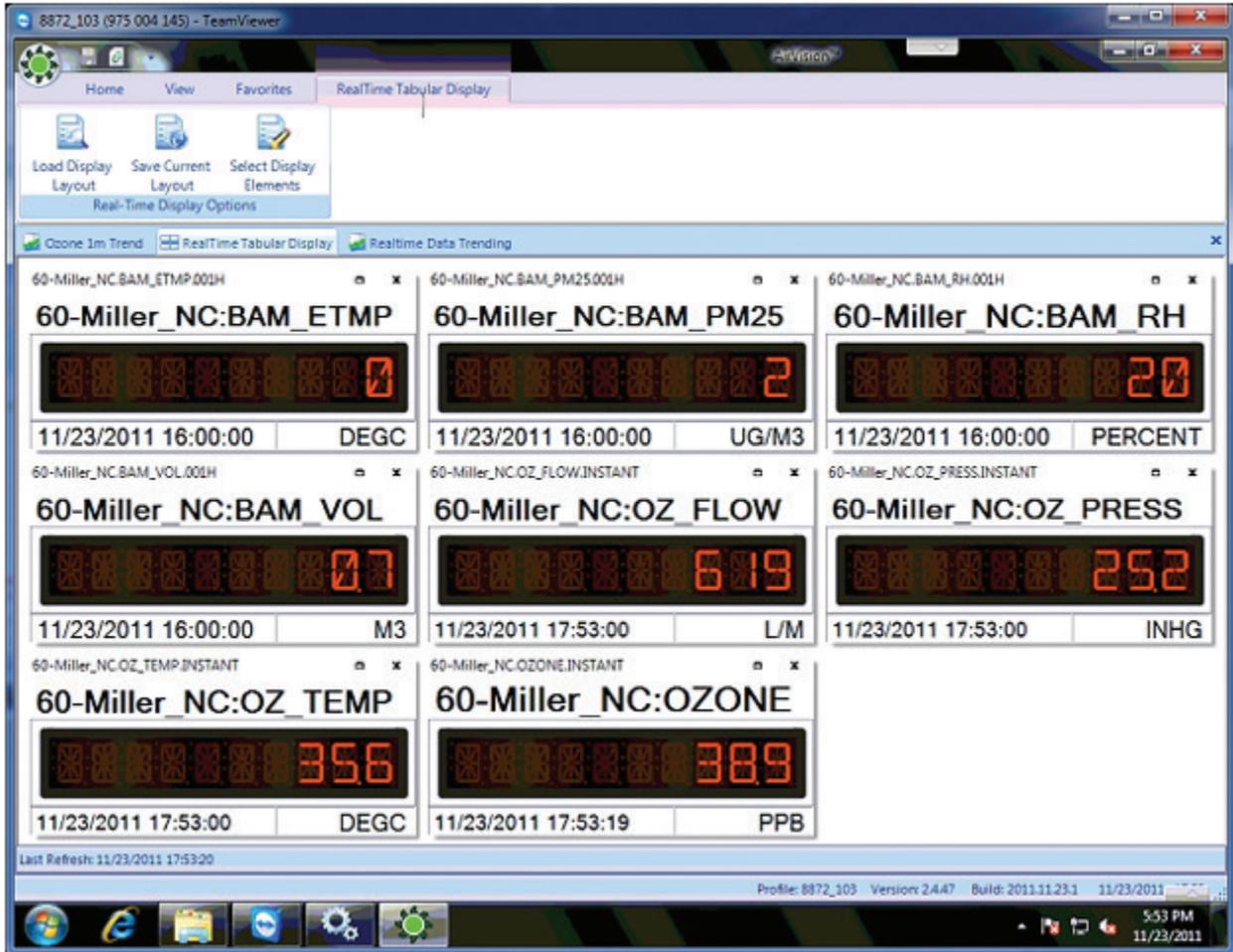
- ◆ **Annotate Selected** - this will allow the user to add a text annotation to the data, which will appear in future use of the Data Editor, or can be recalled in the Annotations Report.
- ◆ **Analyze Selected** - this will bring up a box, allowing the user to see an average, or other statistics of only the selected data points. This is commonly used to average calibration or test “runs” of data. The results can also be printed or saved using the “Print/Export Grid” button.



Right Click

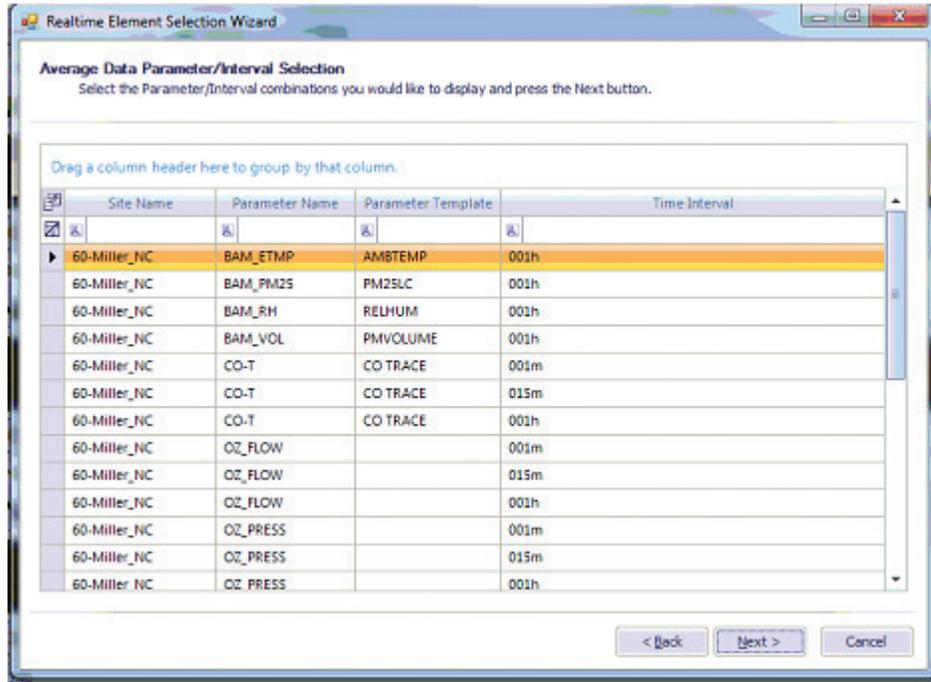
### Tabular Display

The **Tabular Display** provides a series of LED-like displays, which can be zoomed in to time-series charts. The chart display is very useful for mixing multiple display averages (instantaneous, minute, hourly, etc) on the same page. Boxes can be dragged to create a custom layout, and the layout can be saved for future recall. Because of the complexity of the elements in the layout, they are stored separately than the regular Favorites system.

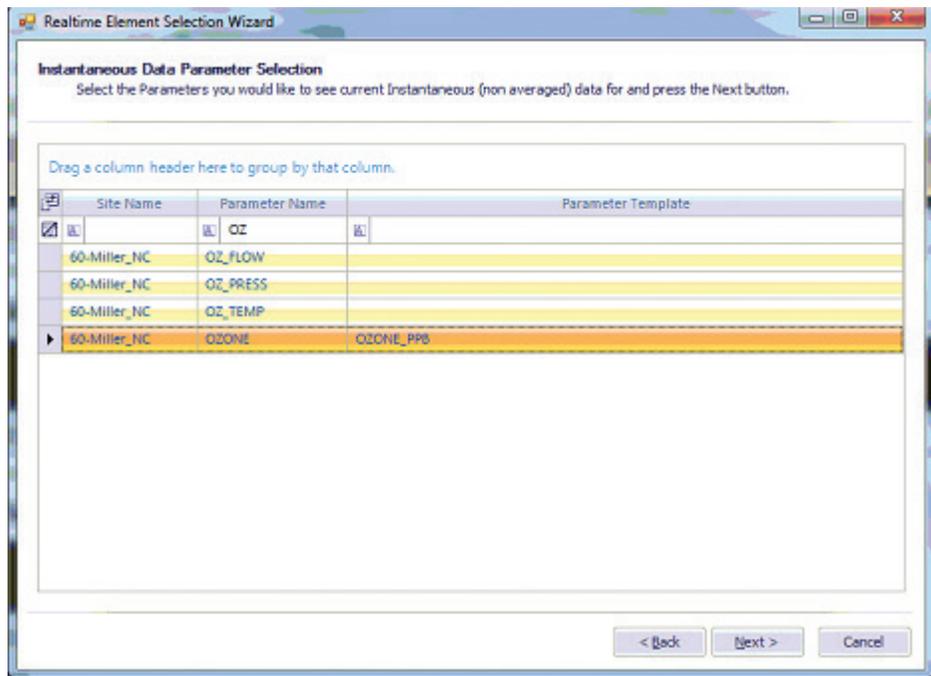


Create a new layout by clicking the Select Display Elements icon from the ribbon

You can use the filter fields to narrow parameter names and, more importantly, average intervals, if needed. The form supports standard Windows drag-select, shift-select, and CTRL-select actions. Note that the display will support multiple average intervals, so it is possible to mix minute and hourly data (e.g., analyzers and BAMs) on the same screen. Instantaneous data panels are selected on the next page.

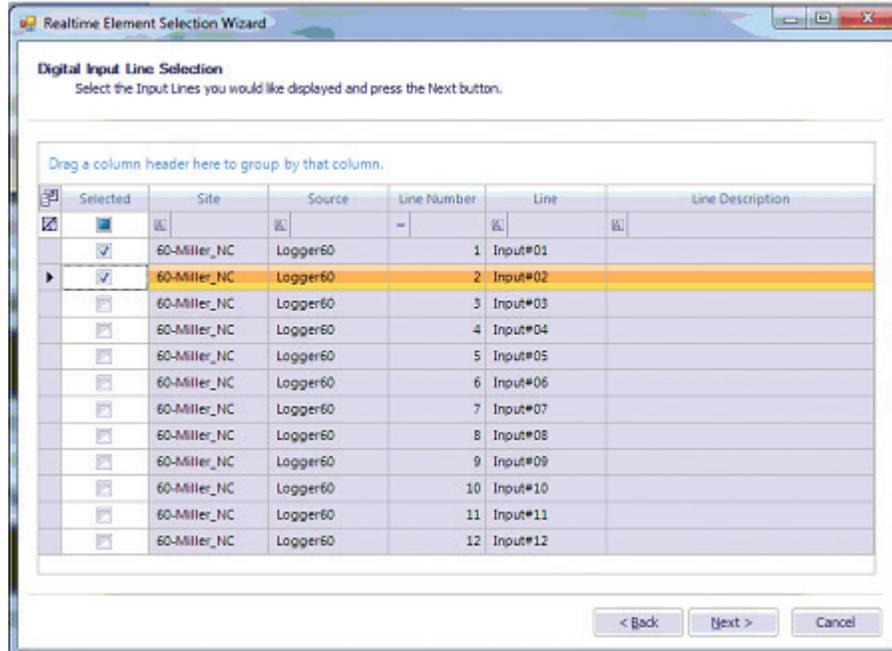


Realtime Element Selection Wizard--Average Data Parameter / Interval Selection



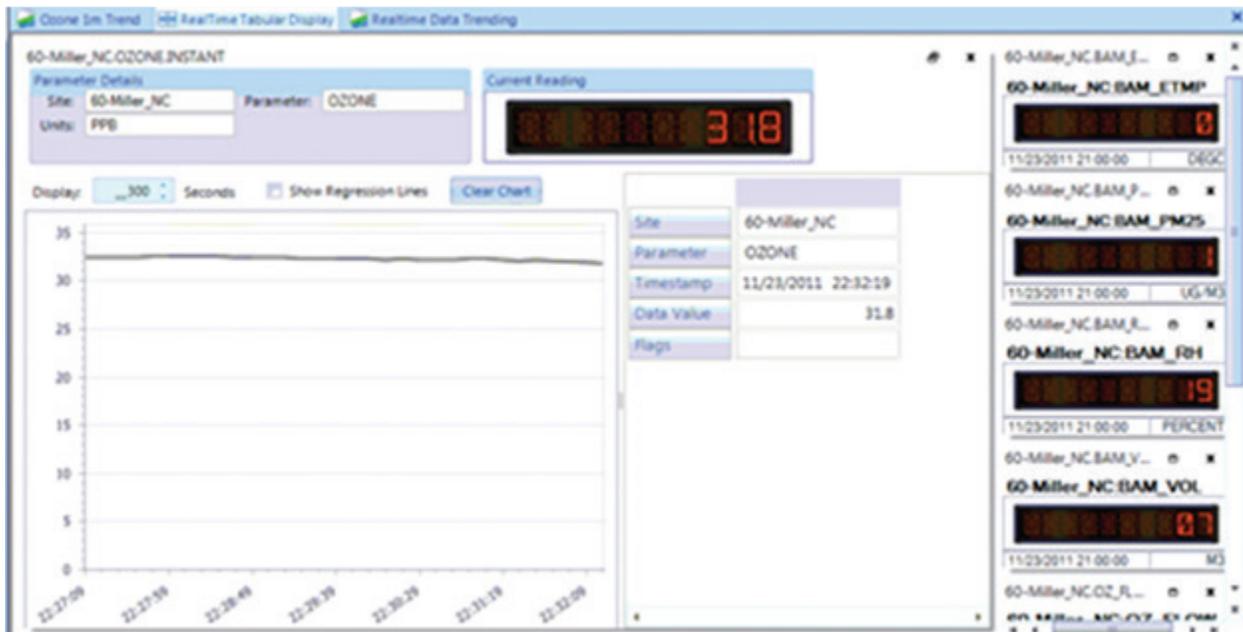
Realtime Element Selection Wizard--Instantaneous Data Parameter Selection

Finally, the Wizard asks if you want to view the realtime status of any digital input status lines. Select lines by clicking the left-side check boxes.



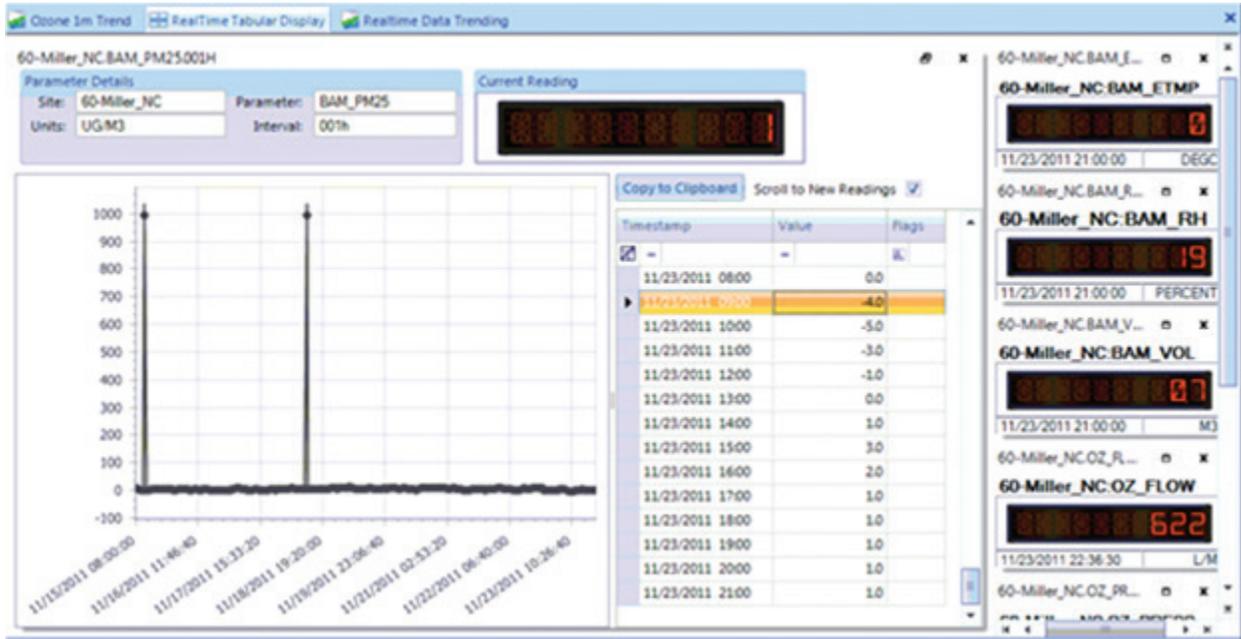
Realtime Element Selection Wizard--Digital Input Line Selection

Once the wizard is finished, the display will start and begin updating. Panels can be dragged into any desired order/arrangement by click-drag (click and drag from the **title bar** area at the top, above the large-font name). Panels can be eliminated by clicking the **X** box in the upper right. To zoom into a particular reading, click the expand box to the left of the **X**.



Updating Display with movable Panels

The other panels will minimize, and the selected parameters will expand into a trend chart, with an LED panel, still updating the current reading / average. For instantaneous data, the duration of the display can be modified if needed. Instantaneous readings default to show the previous 5 minutes, while charts of averages are longer. Instantaneous readings also have an option to show a trendline of the general direction of the newest readings.



A grid of previous averages for averaged data.

To return the display to its previous mode, click the resize button (two stacked windows) next to the X close box.

### Site Node Logger Tool Box

The **Site Node Logger Tool Box** contains four tabs:

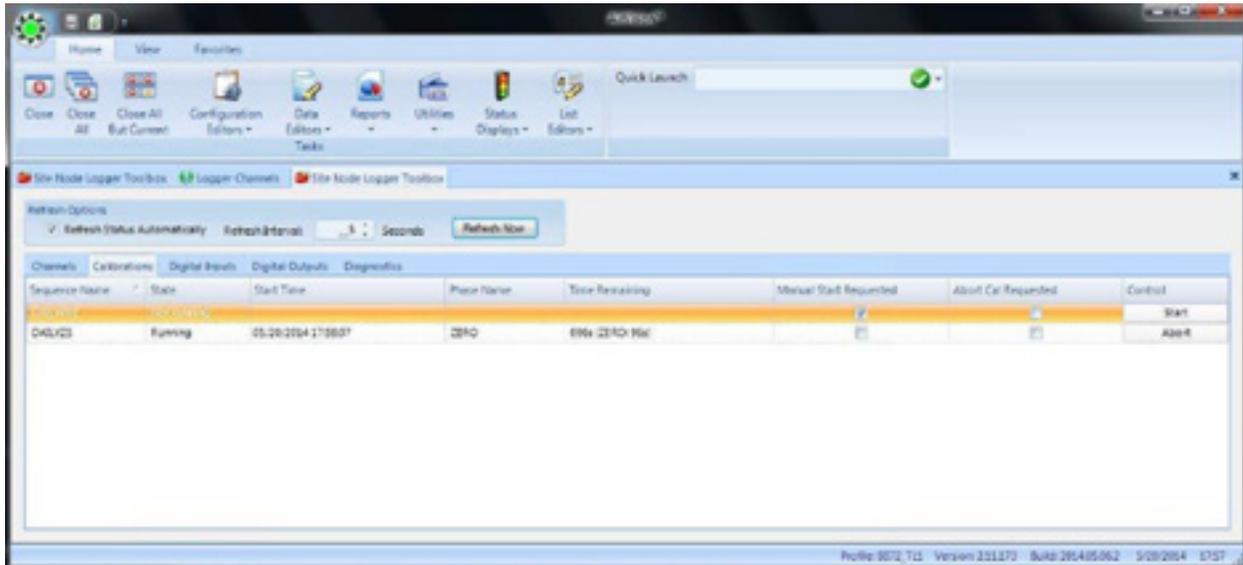
- ◆ **Channels Tab** shows the current of readings of all channels (analog input, serial, or Modbus), as well as provide buttons to control and display the disabled (**D**) and maintenance (**M**) status of each channel. To mark a channel in/out of maintenance or to mark/unmark disabled, click the button.

Channel Number	Channel Name	Parameter Name	Time Stamp	Value	Units	Flags	Enabled	Disabled Flag	Maintenance Flag
2	CO	CO	09/02/2004 15:0007	0.082	PPM		True	False	False
4	NO2	NO2	09/02/2004 15:0004	22.79	PPB		True	False	False
5	NOX	NOX	09/02/2004 15:0004	10.33	PPB		True	False	False
6	NO	NO	09/02/2004 15:0004	7.14	PPB		True	False	False
17	WDR	WDR	09/02/2004 15:0009	96	DEG		True	False	False
18	WSP	WSP	09/02/2004 15:0009	4.8	MMH		True	False	False
19	AMPTEMP	AMPTEMP	09/02/2004 15:0009	5	DEGC		True	False	False
20	BAUPRESS	BAUPRESS	09/02/2004 15:0009	765	MMHG		True	False	False
21	REPAIR	REPAIRSTATUS	09/02/2004 15:0009	85.9	PERCENT		True	False	False
25	NO2_SampFlow	NO2_SampFlow	09/02/2004 15:0004	1032	L/M		True	False	False
26	NOX_SampPress	NOX_SampPress	09/02/2004 15:0004	27.0	MMHG		True	False	False
27	NOX_SampTemp	NOX_SampTemp	09/02/2004 15:0004	5.0	DEGC		True	False	False
28	CO_SampFlow	CO_SampFlow	09/02/2004 15:0007	1894.7	L/M		True	False	False
29	CO_SampPress	CO_SampPress	09/02/2004 15:0007	29.1	MMHG		True	False	False
30	CO_SampTemp	CO_SampTemp	09/02/2004 15:0007	49.0	DEGC		True	False	False
40	RAINFALL	RAINFALL	09/02/2004 15:0009	0.000	INCHES		True	False	False
42	WSP_rain	WSP_rain			MMH		False	False	False

### Channels Tab

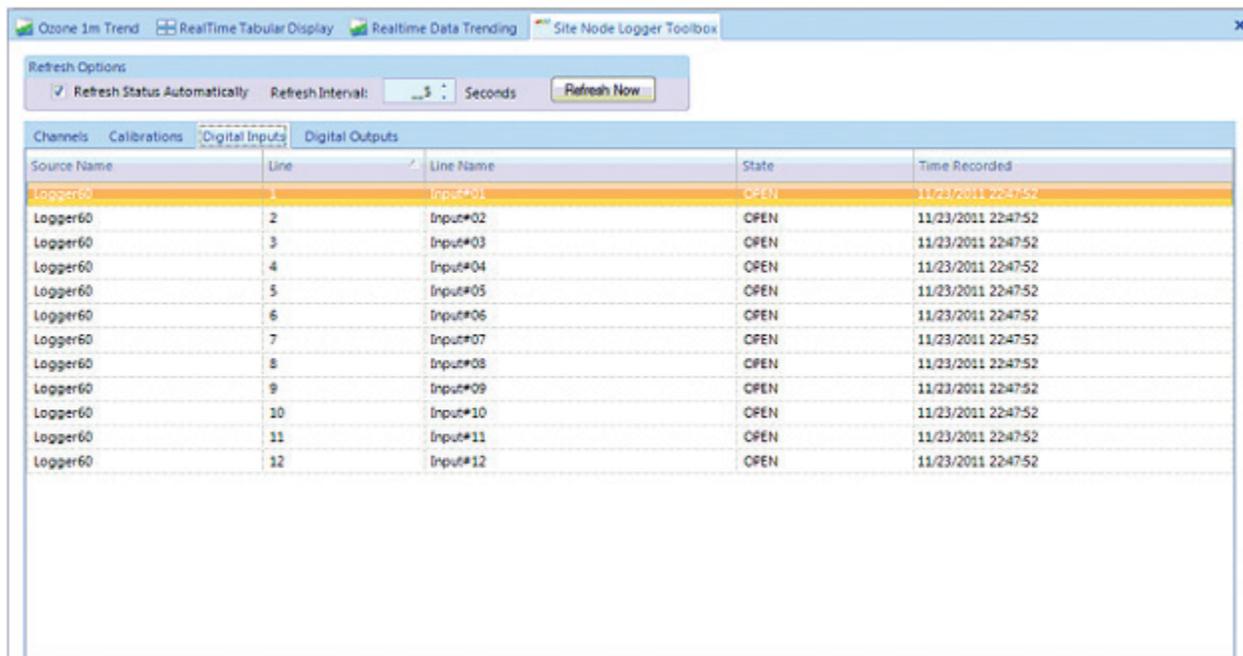
The **Enable** button can be used to enable or disable all data acquisition to an instrument - this is the recommended approach for a Modbus/GSI instrument that is removed or powered off.

- ◆ **Calibrations Tab** shows the current status of all configured calibration programs, as well as provide buttons to start or abort those calibrations.



Calibrations Tab

- ◆ **Digital Input and Output Tab** shows the current status of all status input output lines, both for physical inputs and remote (Modbus) lines. No control functions exist in these displays.



Digital Input and Output Tab

## Application Notes

### Appendix A Setting up Analog Outputs on the Model 8872

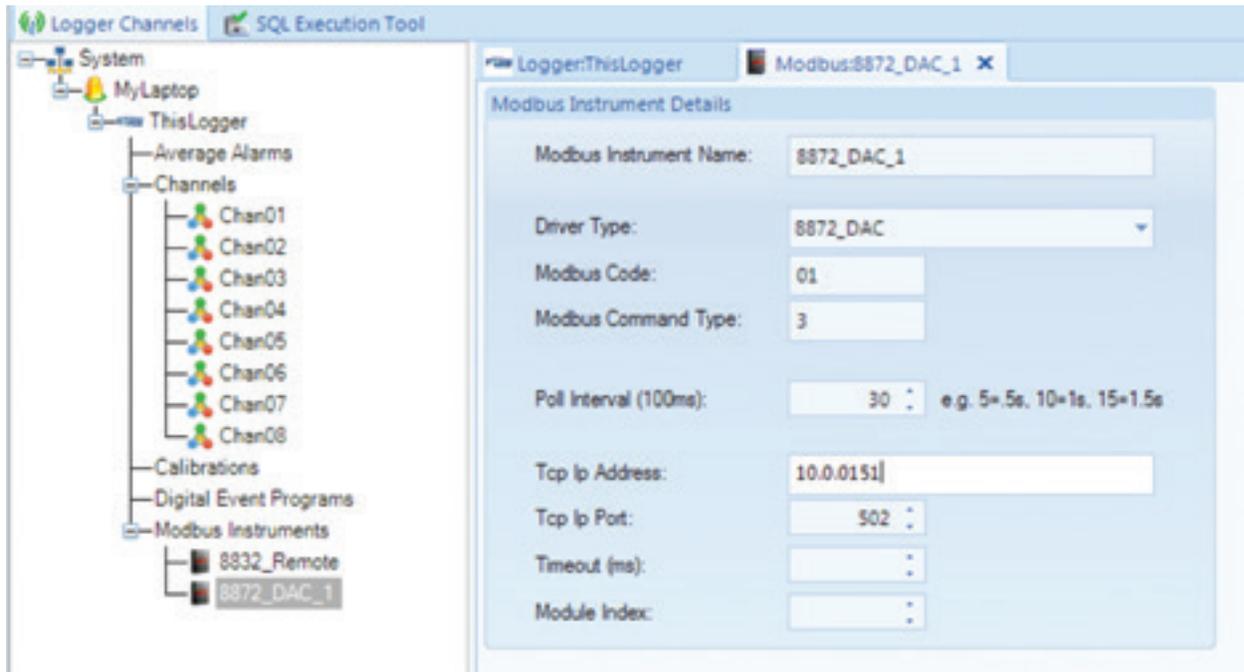
The Model 8872 does not use any custom analog output boards, but rather has the capability to talk to a wide variety of Modbus-based analog output modules commonly available. The most common we use (and the one for this illustration) is the Acromag 972/973EN-4004 device.

If purchased from Agilair, the units will be preprogrammed with IP addresses compatible with the Model 8872's External I/O network. The first module will be 10.0.0.151, the second will be 10.0.0.152, etc.

The unit is DIN-rail mounted, and must be given a 15-36 VDC power supply (not provided by 8872, typically a DIN rail power supply). The user should then connect the module to the "External I/O" network (rear panel) through a basic passive Ethernet switch:

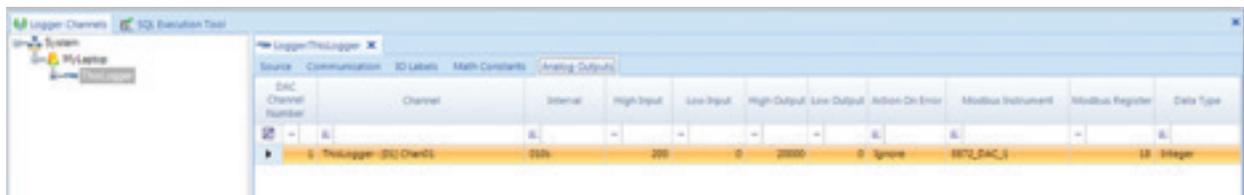


Next, create a Logger Modbus Device under **Configuration->Logger Channels** using the supplied driver:



To set the analog output function for each particular analog output channel open the “Analog Outputs” tab. To create a new analog output program, use the bottom row (with the ‘\*’ asterisk) and enter in the fields:

- ◆ DAC Channel Number (1, 2, 3, etc)
- ◆ Channel (Logger)
- ◆ Average Interval to transmit/update (001s for instantaneous)
- ◆ Low/High- represents upper / lower engineering units to be output (e.g. 0 to 500 ppm)
- ◆ Low/High Output – set to 0 and 20,000 for Acromag devices.
- ◆ Action On Error- set to either Ignore, Zero (drive to zero value), Hold, or LowVal (e.g., 4mA).
- ◆ Modbus Instrument- associates with Modbus device.
- ◆ Modbus Register: For Acromag, use:
- ◆ Data Type: Integer

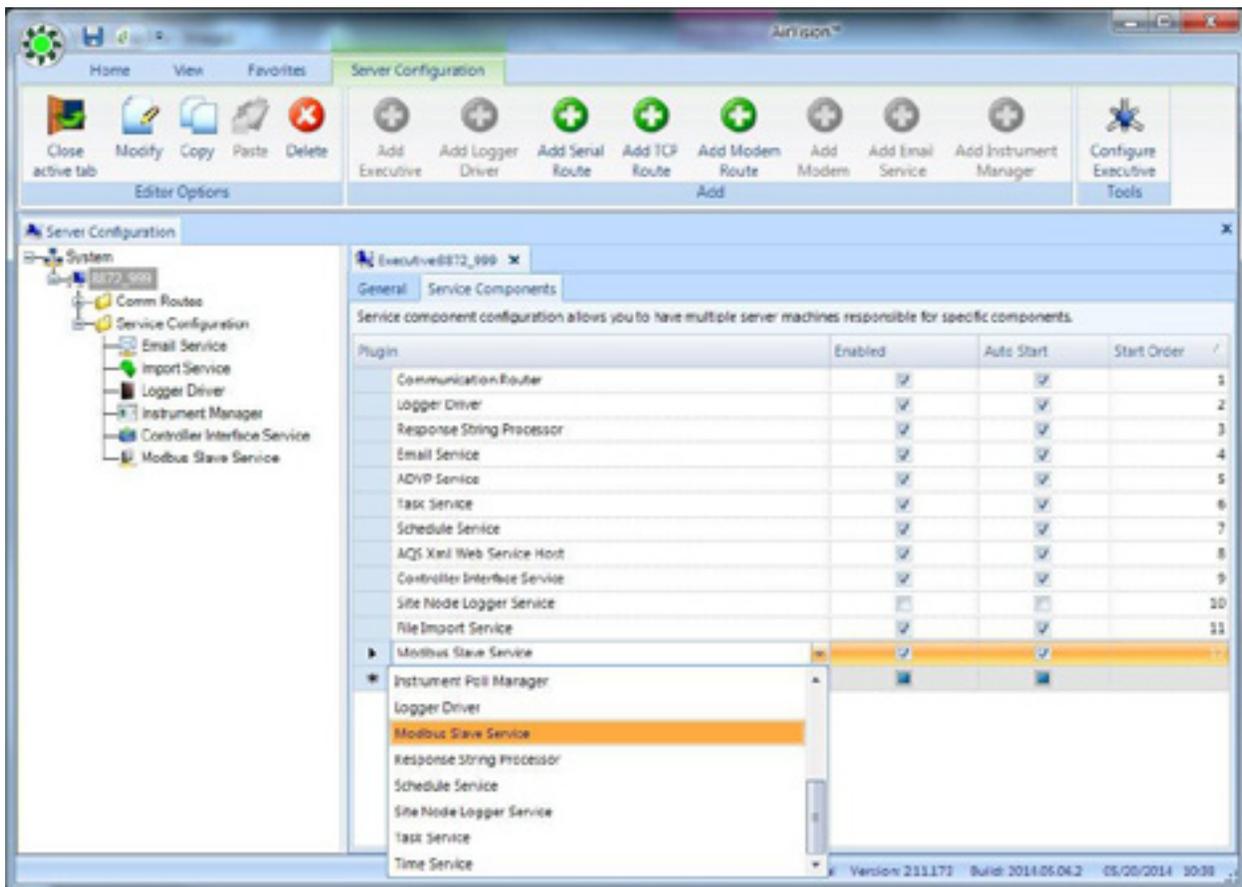


Allow the Site Node Logger service to restart, and the analog output should begin to drive the desired value.

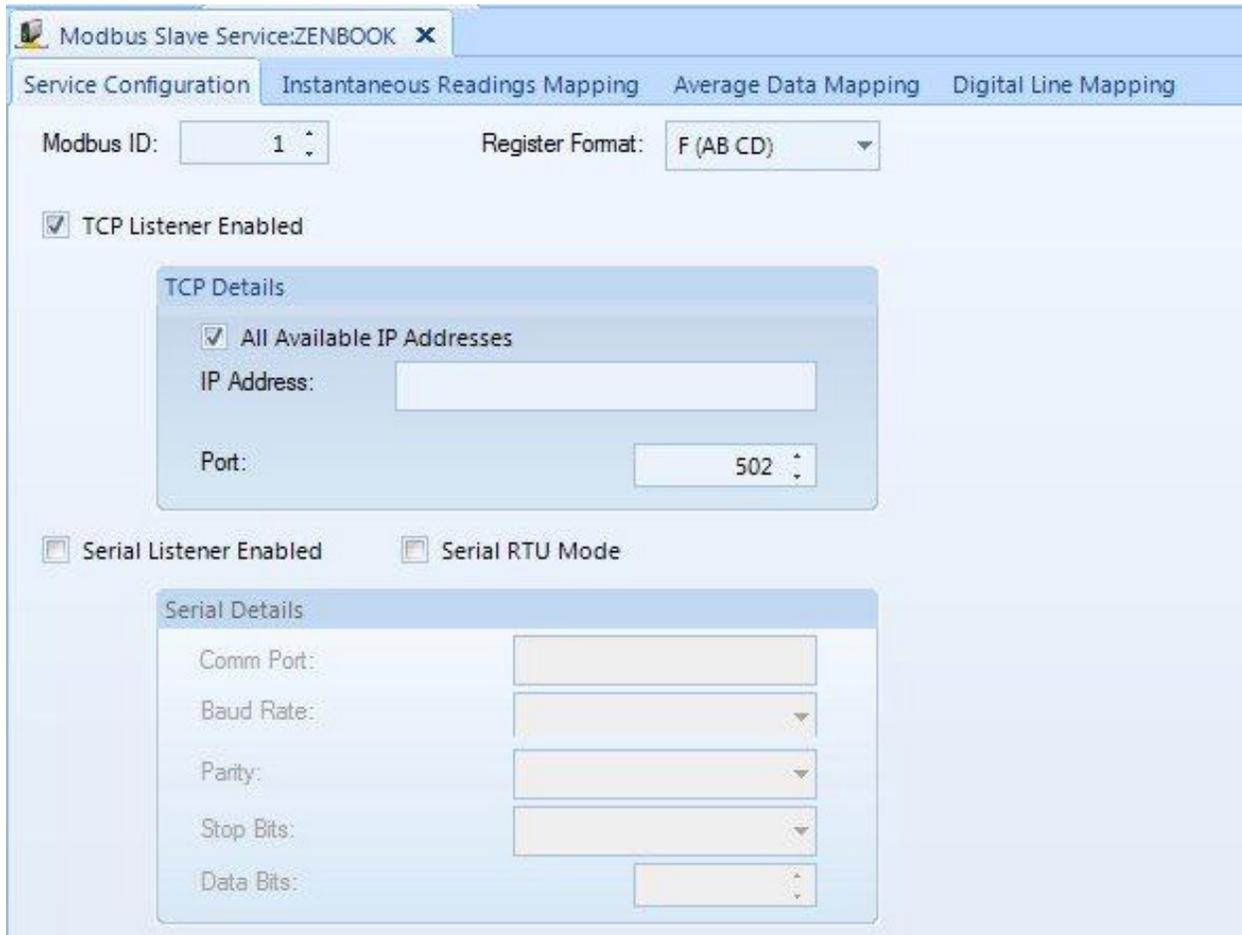
### Appendix B Modbus Slave Plug-In

This plug-in allows for the Model 8872 to act as a Modbus Slave/Server on the network and provide data from the Model 8872 to a distributed control system (DCS) or SCADA system.

To enable the plug-in, go to **Configuration->PC Configuration**, double click on the logger entity, and open the **Plug-Ins** tab. Select a new plug-in, and select **Modbus Slave Service**.



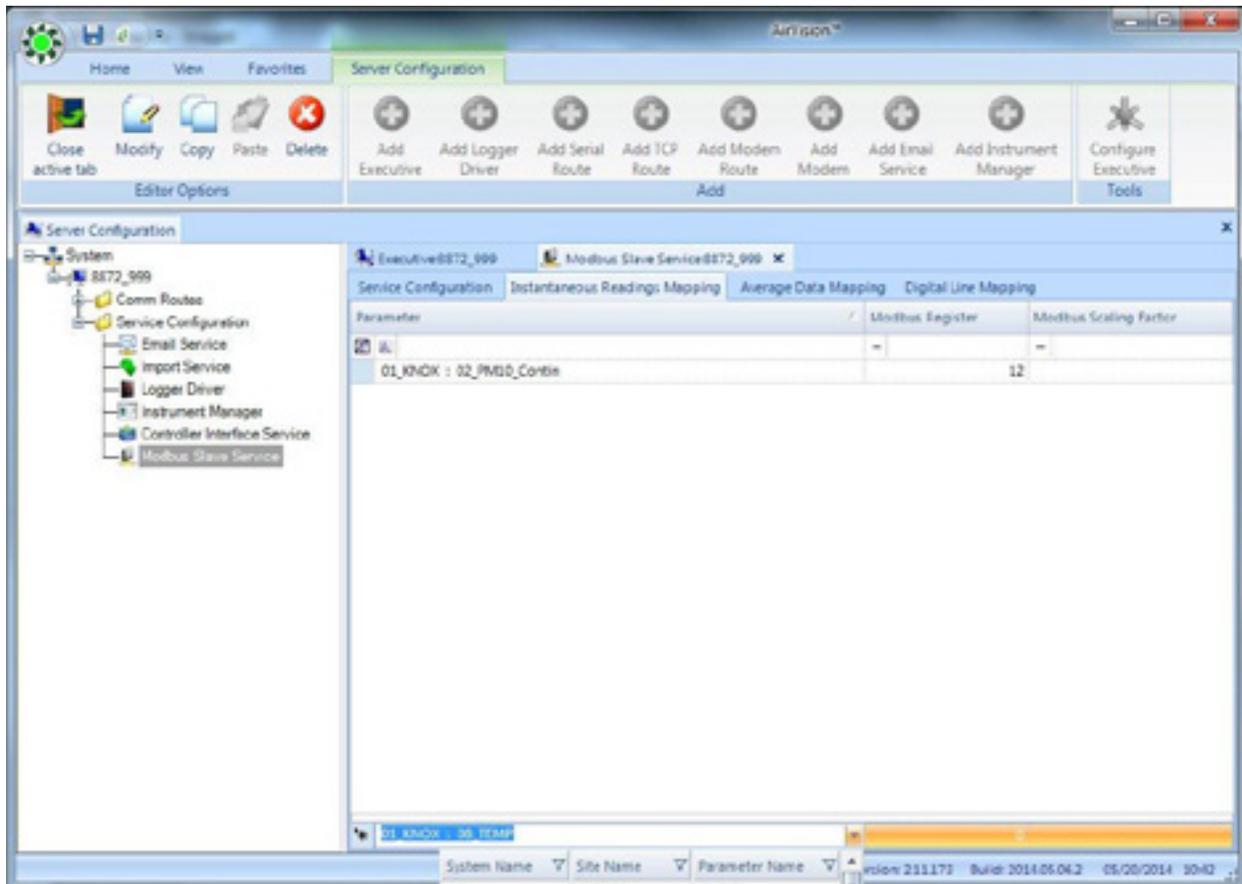
Save, and allow the service to restart. The left side panel will now show an item for the new service. Double-click on it to open the properties:



From here, we can set the Modbus ID (required by some DCS/SCADA systems), the default format for floating point numbers (consult DCS/SCADA guidelines), or if you wish to portray the data as 16-bit integers (RTU). You may also define whether you wish to use one of the RS-232 ports as well as the standard TCP Port 502.

Once you have made these settings, you can go into the other three tabs and create the ‘tags’ that you wish to portray to the DCS/SCADA system. These include instantaneous readings and averages (represented as registers) or digital inputs (represented as coils).

Click in the \* section at the bottom of the screen to add a new tag:

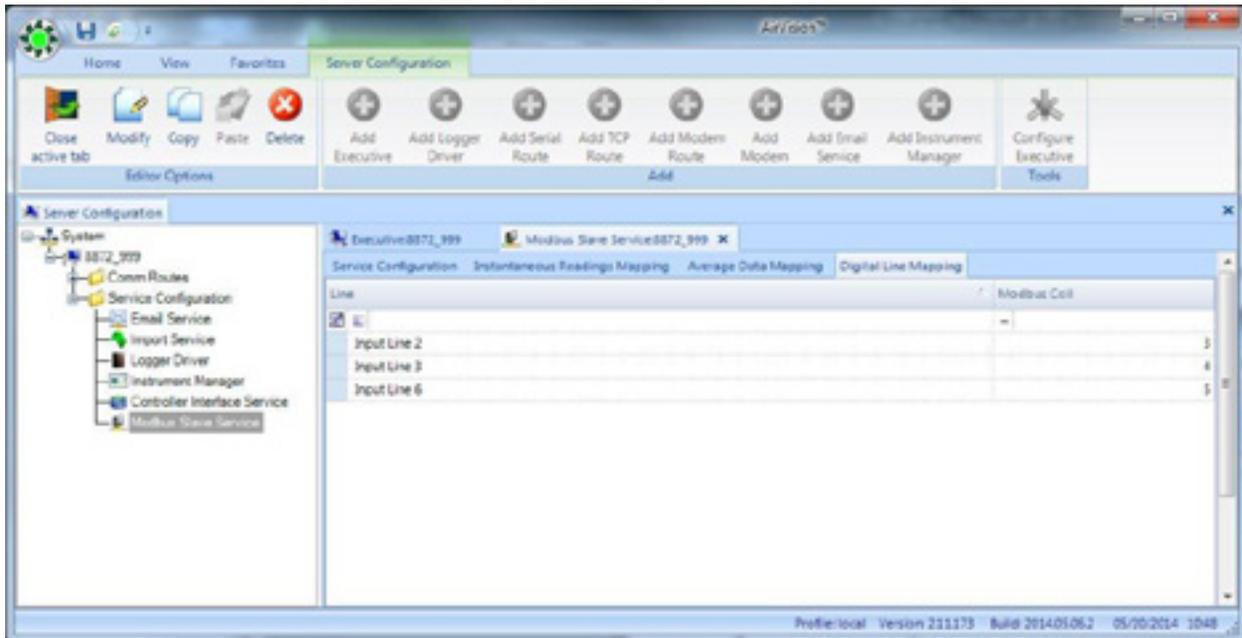


The scaling factor is only used when the default register format is set to 16-bit integers, otherwise it is ignored / does not need to be set. The scaling factor is used to convert values to integers (and the appropriate logic will need to be set on the DCS/SCADA end as well):

$$\text{Integer Value} = \text{Floating Point Value} / \text{Scaling Factor.}$$

Thus, a scaling factor of 0.01 will convert a value of 1.23 into integer ‘123’. Values are rounded.

Coils are simply mapped to a status input point and only take up one “number” space each:



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