



Platform Services

BACnet Trends Management



APPLICATION NOTE

October 2015

Description: Steps for displaying data from Trend Log object instances residing in BACnet device, how to configure them, and how to store Trend Log object buffer data.

Introduction

The BACnet protocol specifies two objects capable of storing pairs of time/value (samples) into a device's internal buffer – Trend Log (TL) and Trend Log Multiple (TLM). The difference between these two objects is apparent – a simple Trend Log object can store values from one given property, while a Trend Log Multiple object can store values from multiple properties at the same time. The BACnet protocol specification states that all operations, including data storage, take place on the BACnet device. The size of the data buffer depends on the device itself and the TL or TLM object settings.

Trend Log-enabled objects support new samples notification, meaning any clients connected to a TL or TLM object will receive notification of a new sample so that it can query for new data from the buffer.

ICONICS products (GENESIS64 and Hyper Historian) allow you to create TL and TLM object instances, visualize the TL or TLM object instance's buffer as a trend or table, and store buffer data to a hard drive.

Before stepping through this application note, please verify that your BACnet device is discovered and added to your BACnet Runtime cache or database. For assistance doing this, see the *BACnet - Network and Device Discovery* application note.

Trend Log (Multiple) object properties

Both object types support these core Trend Log related properties:

- **Notification Threshold:** Defines the number of new records/samples before notifying the subscribed client that it should query for new data.
- **Notification Class:** Specifies the Notification Class object instance through which the subscribed client will be notified about new data.
- **Buffer Size:** Defines size of the buffer used for storing of data samples
- **Logging Period:** Defines how often a TLM object will query for a property's value and store it in the buffer. This is measured by .01 seconds (a value of 500 will result in a sample every 5 seconds)

- **Stop When Full:** When True (Enabled), Logging will stop if the buffer is full. When False (Disabled), the logger will overwrite the oldest samples in the buffer.
- **Log Enabled:** Specifies whether referenced property or properties (in case of TLM object) are logged
- **Referenced object(s):** Specifies which object(s) and their properties are being polled to store values to the buffer

Visualizing data from BACnet Trend Log object instance buffer as a trend

To display BACnet Trends, do the following:

1. Launch GraphWorX64.
2. Insert the TrendWorX64 Viewer control by choosing it in the 'Controls' tab and drawing a rectangle on the canvas to place a TrendWorX64 Viewer.
3. Double-click the displayed viewer in order to open its properties and settings.

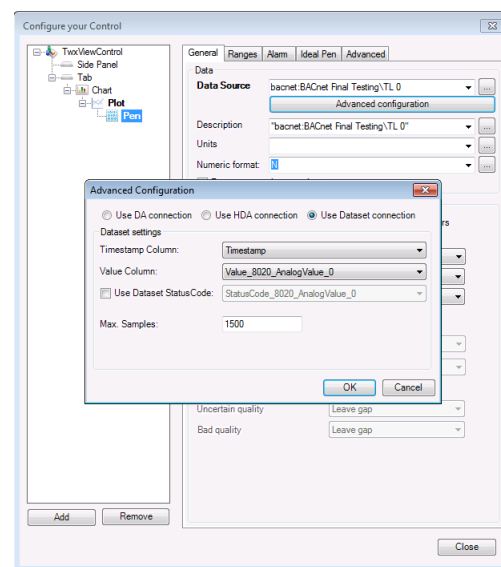


Figure 1: Setting up BACnet dataset binding in TWX Viewer

4. In the opened dialog window, right-click the "Chart" tree item and choose "Add" → "Plot".
5. Now right-click the newly created 'Plot' item in the tree and choose "Add" → "Pen".
6. Select the newly created pen in the tree and in the "Data" section, click the "..." button next to "Data Source". The Data Browser will be opened.
7. In the Data Browser's "Shortcuts" pane, on the left side, choose "Home" and you'll be moved to the root of Data Browser.
8. In the "Grid", choose "BACnet" at the very top of the list.



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9. Choose (by double-clicking) your desired BACnet device from the list of provided objects.
10. In the list of objects, find your desired Trend Log object (or Trend Log Multiple object) providing trend data and select it.
11. Confirm your selection by clicking OK in Data Browser. (Do not double-click the Trend Log Object to get a list of properties. Just simply select the Trend Log object itself and click OK.) This will add a Data Source path to the selected Trend Log object.
12. Now click the "Advanced Configuration" button placed below the Data Source combo box where the path is listed and a new dialog window will appear to advise that the data binding is correctly set. (See Figure 1)
13. Make sure that the radio button, "Use Dataset connection", is checked.
14. Then, make sure that the Value and Timestamp columns are bound appropriately to the Value and Timestamp columns provided by the Trend Log objects.
15. In cases where you need to display (and retrieve) more than 1,500 samples (default value) per pen, adjust the "Max Samples" value accordingly.
16. Confirm your eventual changes in the "Advanced Configuration" dialog window.
17. Now you can close the dialog window for TrendWorX64 Viewer's configuration.
18. Switch GraphWorX64 to Runtime mode. You will see a line representing data stored in the Trend Log's buffer (You might need to change the vertical scale of graph. To do so, proceed with a left mouse-click to the area of the vertical axis ranges. A dialog window will appear where you can change it or you can navigate back to the TrendWorX64 Viewer's configuration. Select "Chart" in the tree, switch to the "Chart Elements" tab and change the "Y Axis" setting appropriately.

Visualizing data from BACnet Trend Log Multiple object instance buffer

To get data from Trend Log Multiple object instance follow same steps as for simple Trend Log object instance specified above except:

- In step 10 select TLM object instance
- In step 14 bind Value property accordingly to data you want to visualize

Visualizing data from BACnet Trend Log object instance buffer as a table

It is possible to show BACnet Trend Log Multiple object values as a table of values with a timestamp instead of a trend line.

To do this:

1. Put a GridWorX64 Viewer Control within a GraphWorX64 display into configuration mode.
2. Enter the control's configuration by double-clicking it.
3. Select a "Grid" tree item.
4. Create a new subscription by clicking the green "+" button in the "Source" tab and choose "Data Set Tag Subscription" from the context menu.
5. Browse for the Trend Log Multiple object instance (using BACnet Point Manager – BACnet option from the root of the Data Browser). Select it and click "OK".
6. The Trend Log object properties will be resolved. Now you can close the configuration window and switch the display to Runtime mode to see the data

Creating and configuring BACnet Trend Log object instance

In order to create a Trend Log object instance please follow these steps:

1. Launch Workbench Silverlight.
2. Switch to the BACnet provider.
3. In the tree, find desired device (make sure that it is scanned to see it in the tree).
4. Right-click it and, from context menu, select the "Add Object" item.
5. Choose "Trend Log" in the drop-down list.

By default a form will be opened – fill it properties accordingly (you can find their meanings above) and click "Apply" to create a Notification Class.

Creating and configuring BACnet Trend Log Multiple object instance

Steps to create Trend Log multiple object instance are almost same as for Trend Log object, except:

- In step 5 choose "Trend Log Multiple"
- You can specify multiple Referenced Objects

Storing data from BACnet Trend Log or Trend Log Multiple object instance buffer using Hyper Historian

Hyper Historian allows you to store **BACnet Trend Log** buffer data to HDD. In order to do this, you have to:

1. Create a new HH tag.
2. Point "Signal Name" to a Trend Log object you want to log.



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3. Change "Source Type" to "Dataset".
4. Select "Dataset" by clicking the "..." button next to the text box field. In the opened dialog, choose the specific Dataset Column (Source) that should be logged.
5. Apply the changes.

In the case of using a Trend Log Multiple object, you will be able to choose from more Dataset Columns in Dataset Configurator dialog (step 4). You have to create multiple Hyper Historian tags if you want to log more Dataset Columns and point each to the same Trend Log Multiple object but a different Dataset Column.

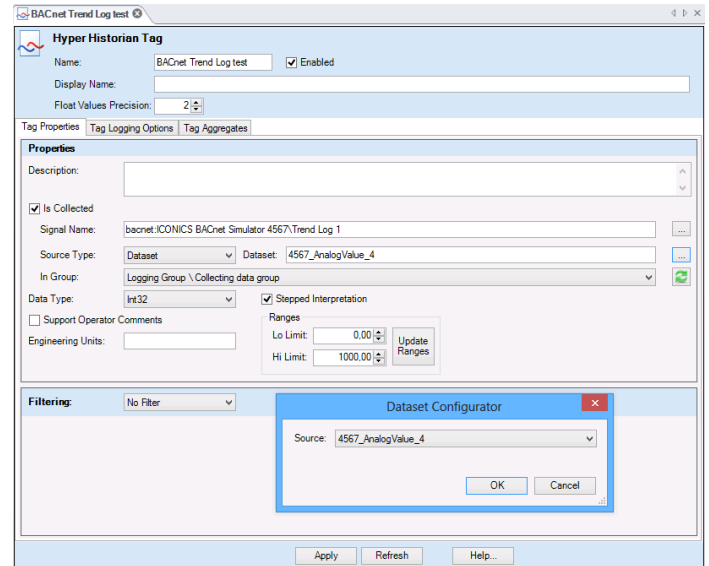


Figure 2: Configuring HH tag to collect data from BACnet Dataset