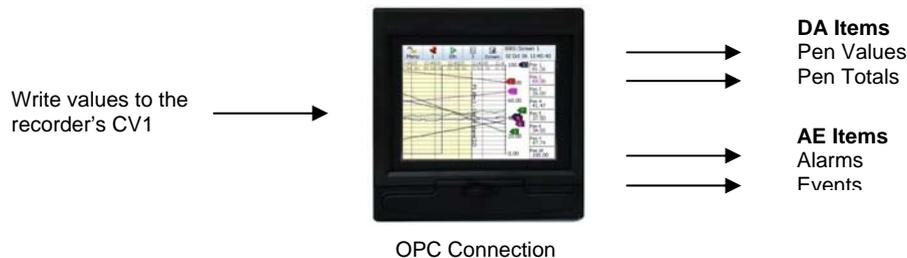


# Application Note 4:

## X-Series Recorder OPC Access

### Using the Integral OPC Server of the QX and SX Recorders

The **QX** and **SX** recorders provide the user with the ability to directly connect to the recorder using the integral OPC Server function to obtain real time data (OPC DA) as well as alarm and event data (OPC A+E). The OPC Server is integral to the recorder and is enabled through the “Firmware Credit” function of the recorder. This feature is another way of helping our users to acquire process information and to get this information directly into their high level plant historian.



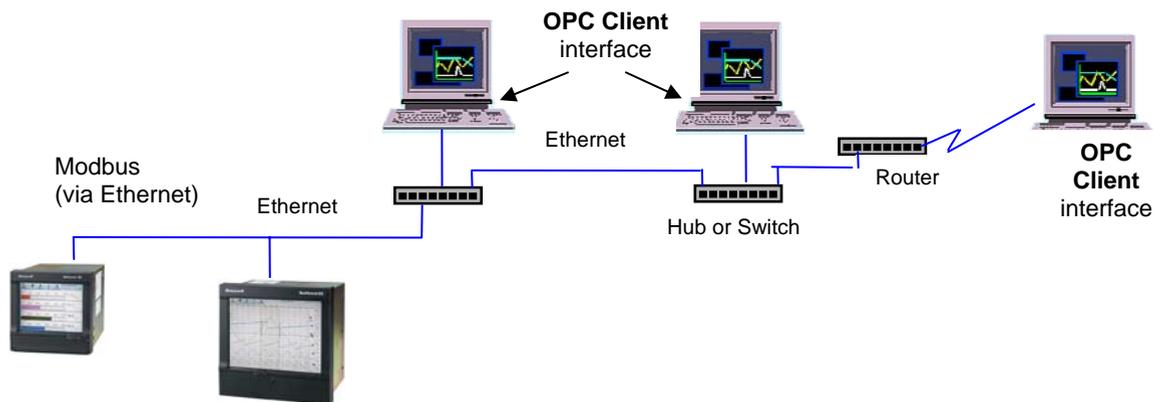
### What are the Benefits of OPC Connectivity?

- **Open connectivity** – customers will be able to choose from a wider variety of client software to communicate with the recorders directly to get real time data, allowing best-in-breed selection. The OPC standard has gained increasing acceptance in recent years. There are hundreds of OPC servers available today to communicate data from industrial hardware. Most popular HMI, SCADA and data acquisition software offer OPC client functionality to allow this data to be easily imported as tags within their database. This could be an HMI package such as Intellution iFix, Wonderware InTouch, or OSI Systems PI data historian software, for example.
- **Plug and Play functionality** – for client applications, OPC makes “Plug and Play” a reality with many offering a “browsing” capability to view available data items from an OPC server for selection and assignment as tags within data groups. Applications written in various languages can communicate easily as long as they are OPC compliant for the same version of OPC. The **QX** and **SX** recorder’s OPC server supports Version 3.0 DA (Data Access) and OPC Alarms and Events.
- **Client/Server architecture** – Recorder’s OPC Server can communicate with several client applications concurrently (such as data acquisition software and HMI packages). This occurs over Ethernet TCP/IP (via Microsoft’s DCOM).
- **High Performance** – OPC provides high data throughput between the client interface and the recorder’s OPC server.

## Background

OPC™ (OLE for Process Control™) is an open software standard that defines common interfaces for ease of data exchange between industrial equipment such as controllers, PLC's, or data recorders and Windows-based applications. The application of OPC standard "client" and "server" interfaces eliminates any requirement for developing a special communications driver for the X-Series recorders to an application. The embedded recorder "OPC server" allows it to easily communicate data, alarms and event information from the **QX** and **SX** recorders to a variety of applications having compliant OPC "client" interface capability. This includes many popular HMI, SCADA, and data historian software packages plus custom software applications developed using Visual BASIC or C++. The recorder's OPC Server can communicate with an OPC Client locally or remotely over Ethernet, as illustrated below. In addition, the OPC Server can provide this data to several OPC client applications concurrently.

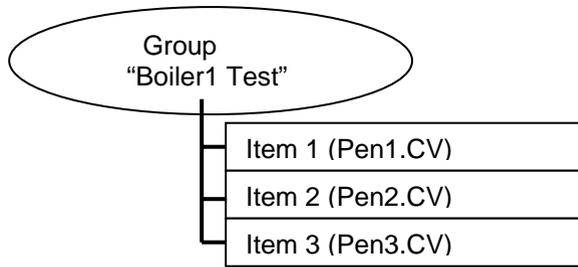
OPC is based on Microsoft's OLE (Object Linking and Embedding, now ActiveX), COM (Component Object Model) and DCOM (Distributed Component Object Model) technology and is available for all 32-bit Windows Operating Systems from Microsoft. COM and DCOM enable the definition of standard objects, methods, and properties for servers of real-time data from industrial control and data acquisition equipment. Additionally, OPC via an OPC Server can provide HMI or office applications with plant floor data via Ethernet networks, remote sites, or the Internet. The diagram below provides an overview of how the recorders can be connected directly from the OPC Client directly to the recorder's OPC Server.



## OPC Data Access Overview

An OPC Server is comprised of several objects related to data access— the server, the group, and the item. The OPC server object serves as a container for OPC group objects, which logically organize OPC data items. Data items represent connections to data sources within the server. These data sources consist of parameters within the recorder which includes Pen Values, Totaliser Values and Communications Values. Data items related to recorders, such as those related to Pens, can be organized into OPC data groups.

There is no external interface defined for an individual OPC data item since all access is via user-defined OPC groups. Exception based connections can also be created between the client and the items in a group and can be enabled and disabled as needed. The OPC client can configure the rate at which the recorder's OPC server provides the data changes to the client. Data items in the OPC Client may be either read or written dependent on the data type directly to the recorder. Associated with each item are the parameters for a Value, Quality, and Time Stamp.



Several data groups may be defined and the group may have data from any recorder connected to the OPC server. The data items in a group may also be of different types, e.g. floating point, integer, or string (text). It is typical for all the items in a group to share the same update time and dead band.

### OPC Client Access to the Recorder's OPC Server

A Windows-based Client application must be used to view data from the **QX** and **SX** recorder's OPC server. Many OPC Client interfaces for software applications can detect a compliant OPC server that is on the Ethernet network. Once found by the application, the OPC Client application may "Connect" to the selected server. In the most user-friendly client applications, the data items for the Server may be "browsed" by the client for Tag selection into named data groups. In other less user-friendly OPC Client applications, the data items for a group are entered as tags via defined text strings. The tags defined then become OPC Tags in the application's database which may also provide EU limits. The recorder's OPC server provides access to each of the defined active Pens (P1 to P96), Totalisers (T1 to T96) and General Communications Values (CV 1 to 64).

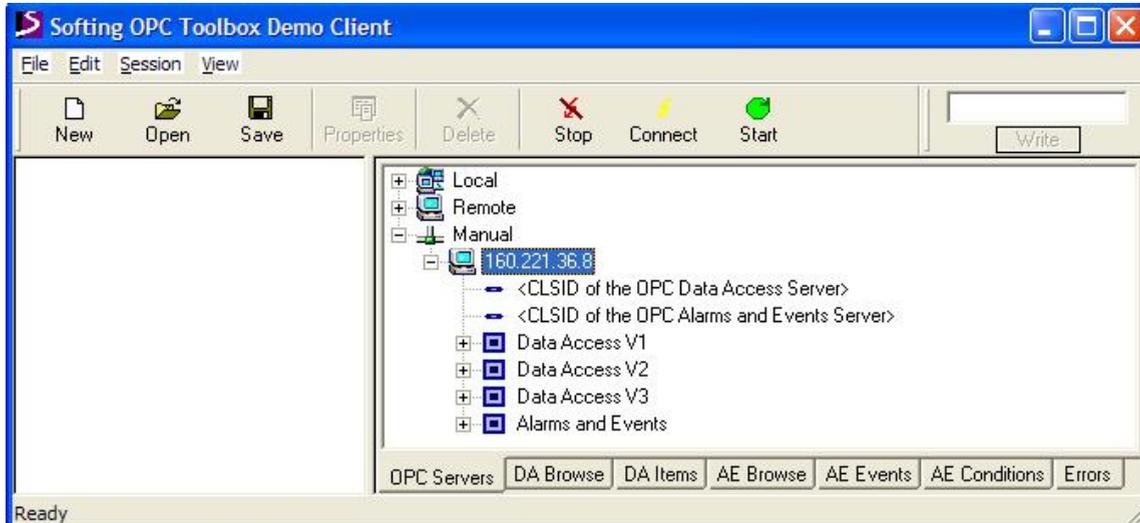
The example below shows how an OPC client may be interfaced to the **QX** or **SX** recorder's OPC server. This example uses an OPC demo client tool box from Softing, which is one of a number of OPC developers for the industrial and process markets. Their OPC demo software can be downloaded for free at: <http://www.softing.com/OPC/>

This example goes through the set up of the Softing OPC Client and how to view real time data and alarm and events directly from the recorder. Before starting, make sure that the OPC Server Credit function has been enabled in the recorder. You also need to make sure that the proper settings have been made in the PC to allow DCOM communications; this set up is covered in a separate application note.



**Softing OPC Toolbox Demo Client Start up Screen**

1. To start, open the Softing OPC Toolbox Demo Client. You should see the above screen showing the “**OPC Servers**” tab which will allow you to connect to the recorder’s OPC Server.
2. Use the **Manual** method to connect to the recorder; clicking on **Manual** item expands to show a PC image with a generic Computer name or address.
3. Highlight the “<Computer name or address>” and enter the IP address of the recorder that you will be connecting to.
4. The IP address can be obtained from the Recorder’s *Status > System > General* screen.
5. Once the IP address has been entered; you will see a screen similar to the one shown below.

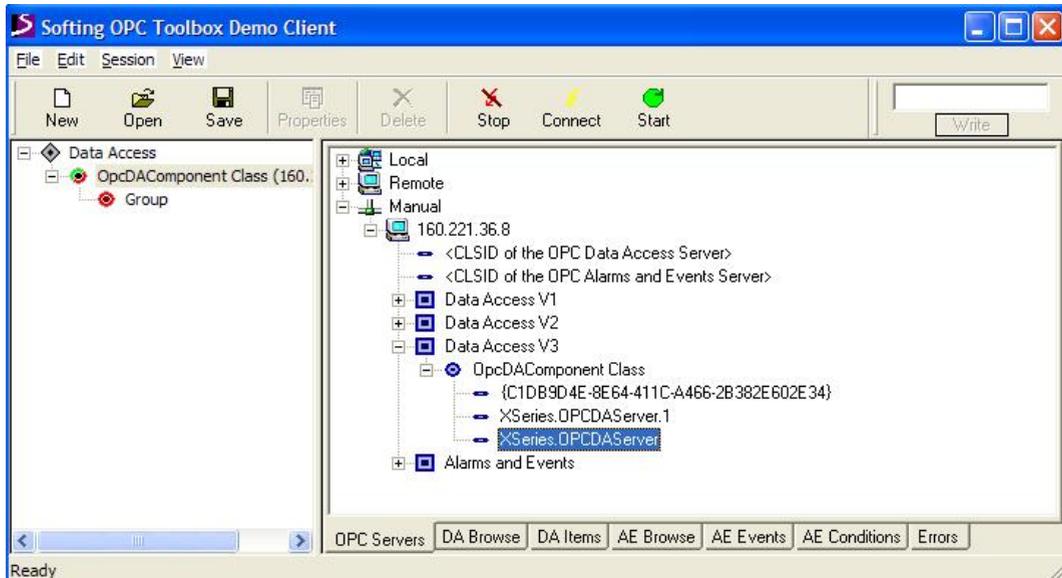


**Softing OPC Toolbox Demo Client After IP Address is Entered**

Since the recorder supports DA 3.0 (Data Access) and Alarms and Events, you need connect to the recorder using the Data Access V3 and Alarms and Events selections.

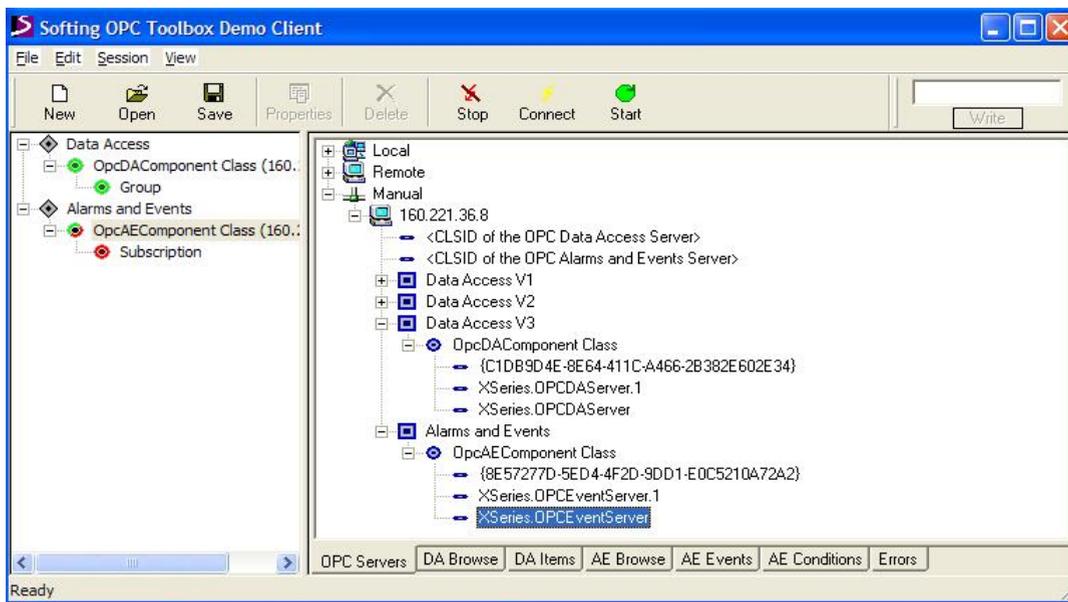
1. Select the + sign next the **Manual** item to expand and reveal the options within, and then do the same for your selected **IP address**.
2. Next, open the **Data Access V3** item, click on the + sign to reveal the options within.
3. Double click on the **XSeries.OPCDAServer** item; this is the general DA Server Prog ID. This will cause the OPC Softing Client to automatically connect to the recorder’s OPC Server.

This will show in the left window pane with the heading of Data Access with the IP address of the connected device. During the process of making the connection the “Circular Indicators” will show half red/half green but turn all green once the connection is successfully made. The process of trying to make the connection is illustrated below.



**Softing OPC Toolbox Demo Client Connecting to the Recorder's OPC Server**

A similar process of clicking on the Alarms and Events is used to connect to the recorder to get the Alarm and Event real time data. Alarms and Events connect as item separate from the Data Access.

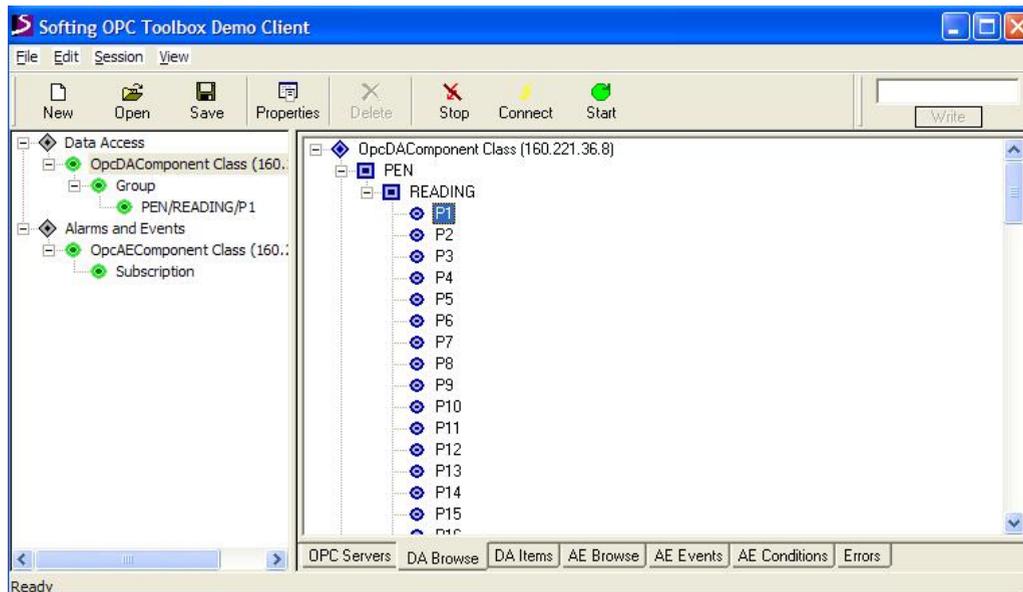


**Softing OPC Toolbox Demo Client Connecting to the Recorder's OPC Server**

Once you have a connection between the OPC Client and the Recorder's OPC Server, you can browse the recorder and view both the real time data and the Alarms and Events.

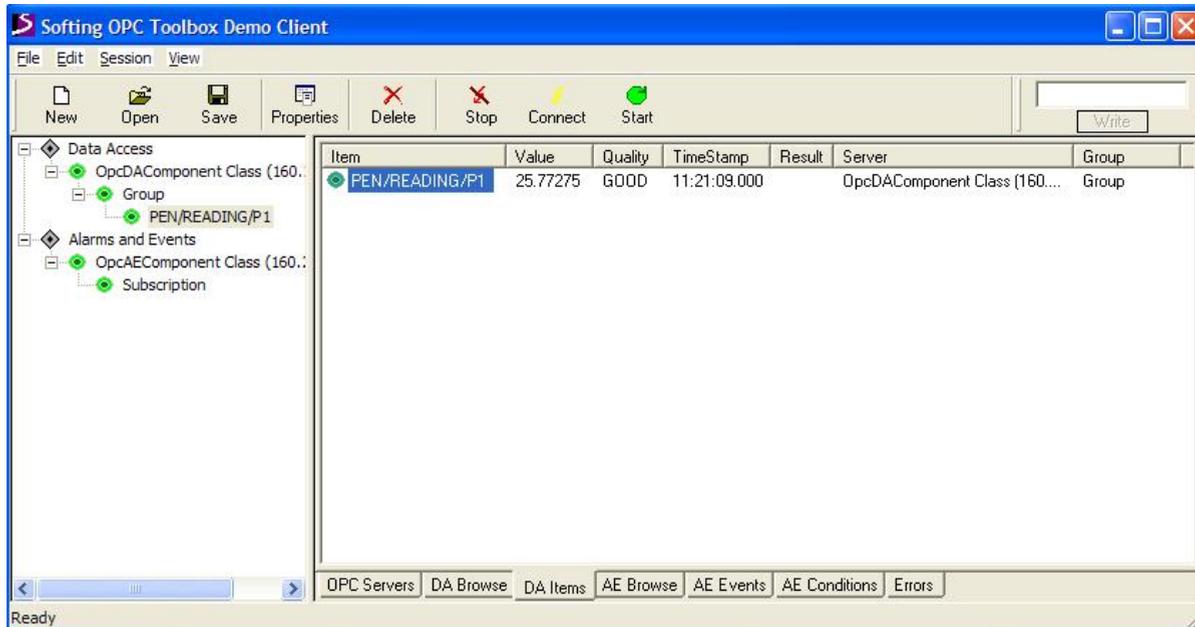
1. To view the data, click on the **"DA Browse"** tab at the bottom of the Softing OPC demo client; this will show parameters for Pens, Totals and General, which in the case of the recorder are Communication Values.
2. Opening these items allows you to double click and move the desired parameter to the left pane of the OPC Client.
3. Once you have done this, you can click on the **"DA Items"** tab and view the actual value for the selected item.

In this example, a Pen Reading for Pen 1 is selected by double clicking on the P1 parameter and adding it to the left window pane of the client.



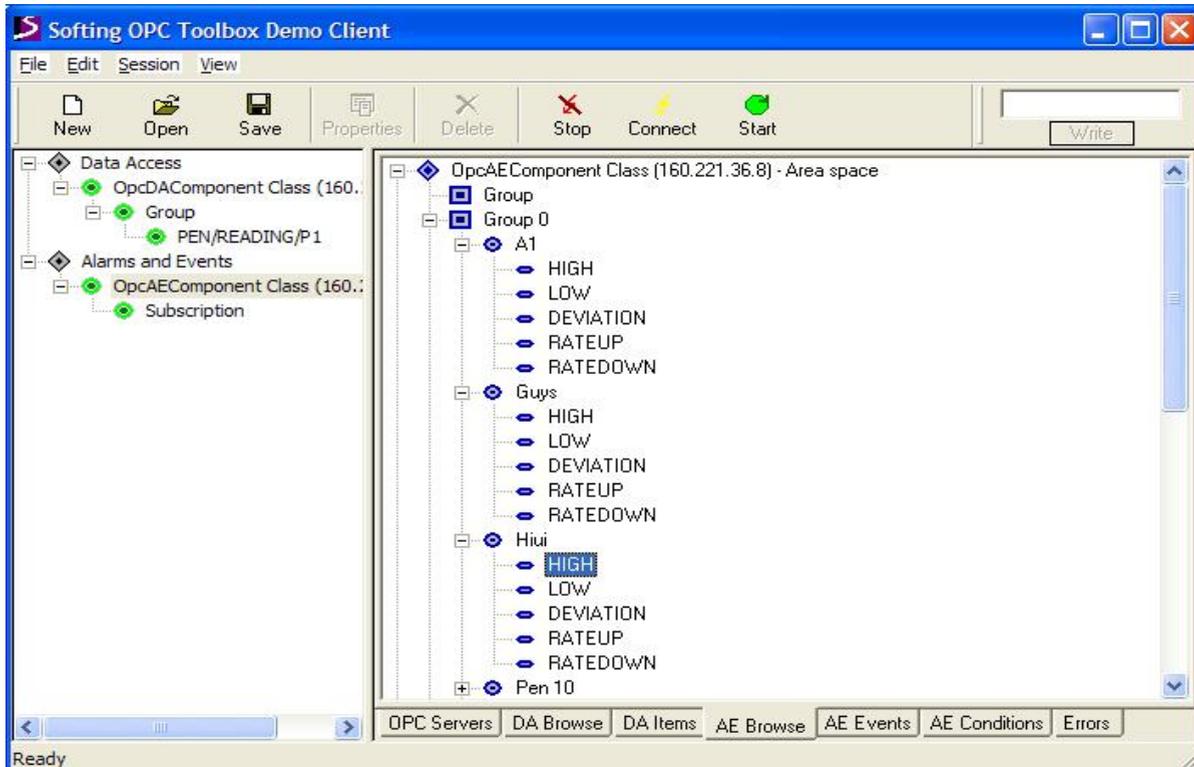
**Softing OPC Toolbox Demo Client Adding the Pen Value to the OPC Client**

Switching from the “**DA Browse**” tab to the “**DA Items**” tab allows you to view the actual Pen Reading P1 in real time as shown below.



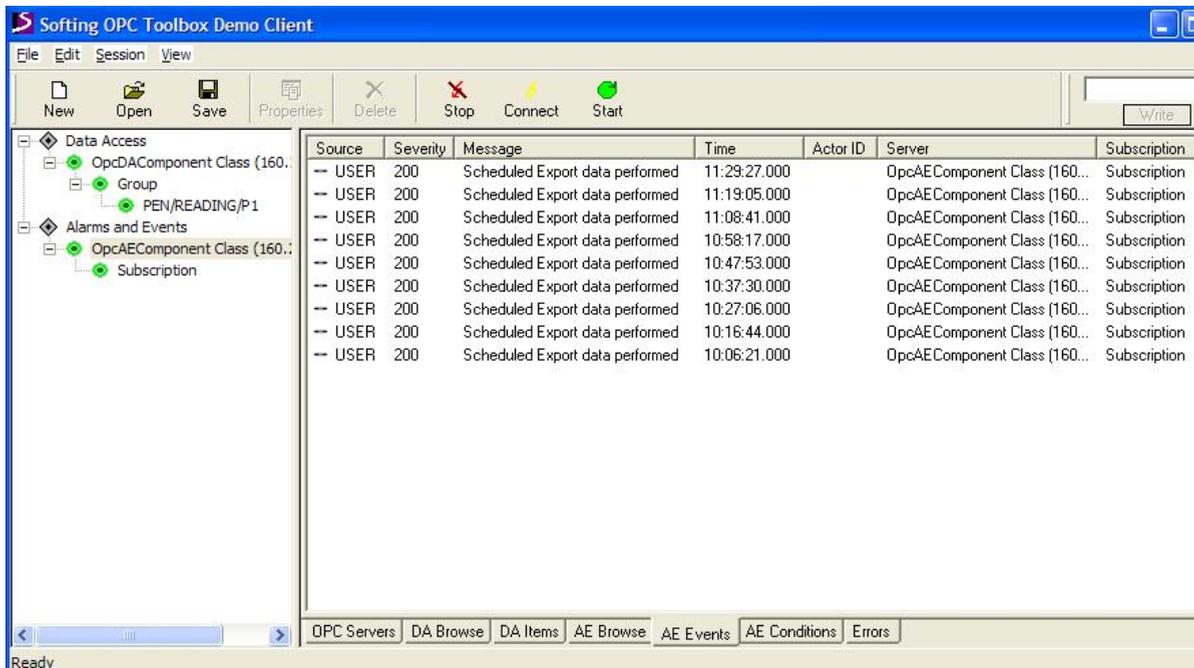
**Softing OPC Toolbox Demo Client Viewing the Real Time Pen Value**

To view Alarm and Event data, click on the “**AE Browse**” tab and add these parameters to the left pane of the OPC Client. No action is required for this client to actually add individual Alarm or Event parameters to the left pane as was the case for the Data Access parameters.



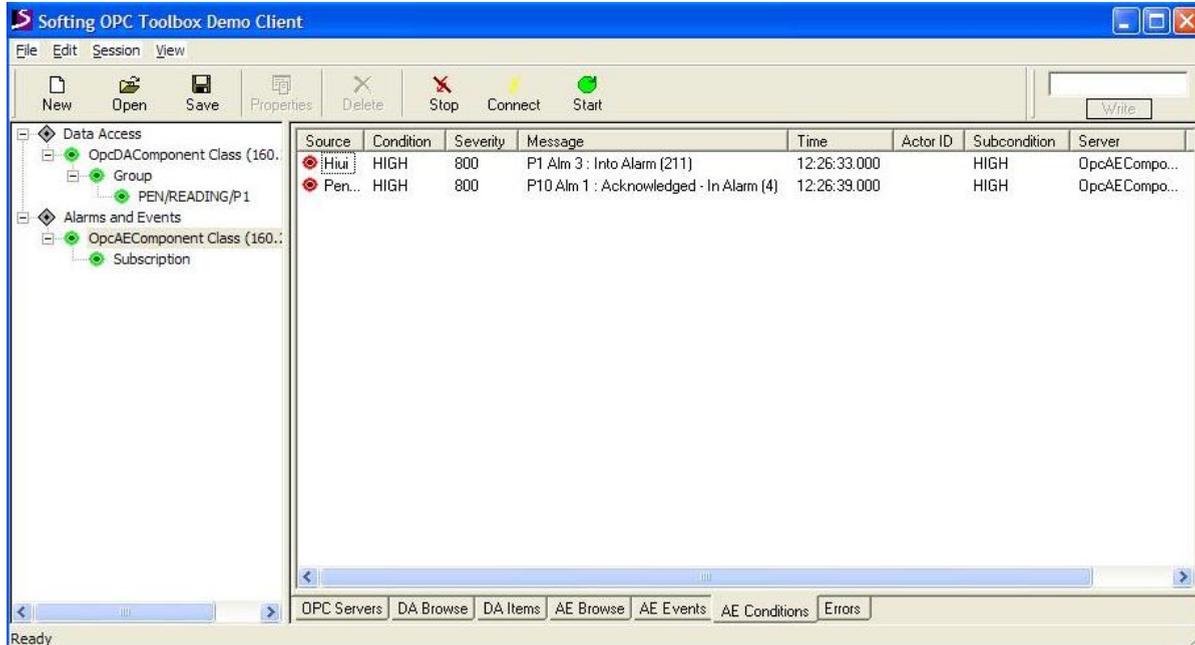
**Softing OPC Toolbox Demo Client Set Up Alarm/Events**

To view the Events, click on the “**AE Events**” tab; this shows the type of event along with the Message and Time associated with that particular Event.



**Softing OPC Toolbox Demo Client Viewing the Real Time Events**

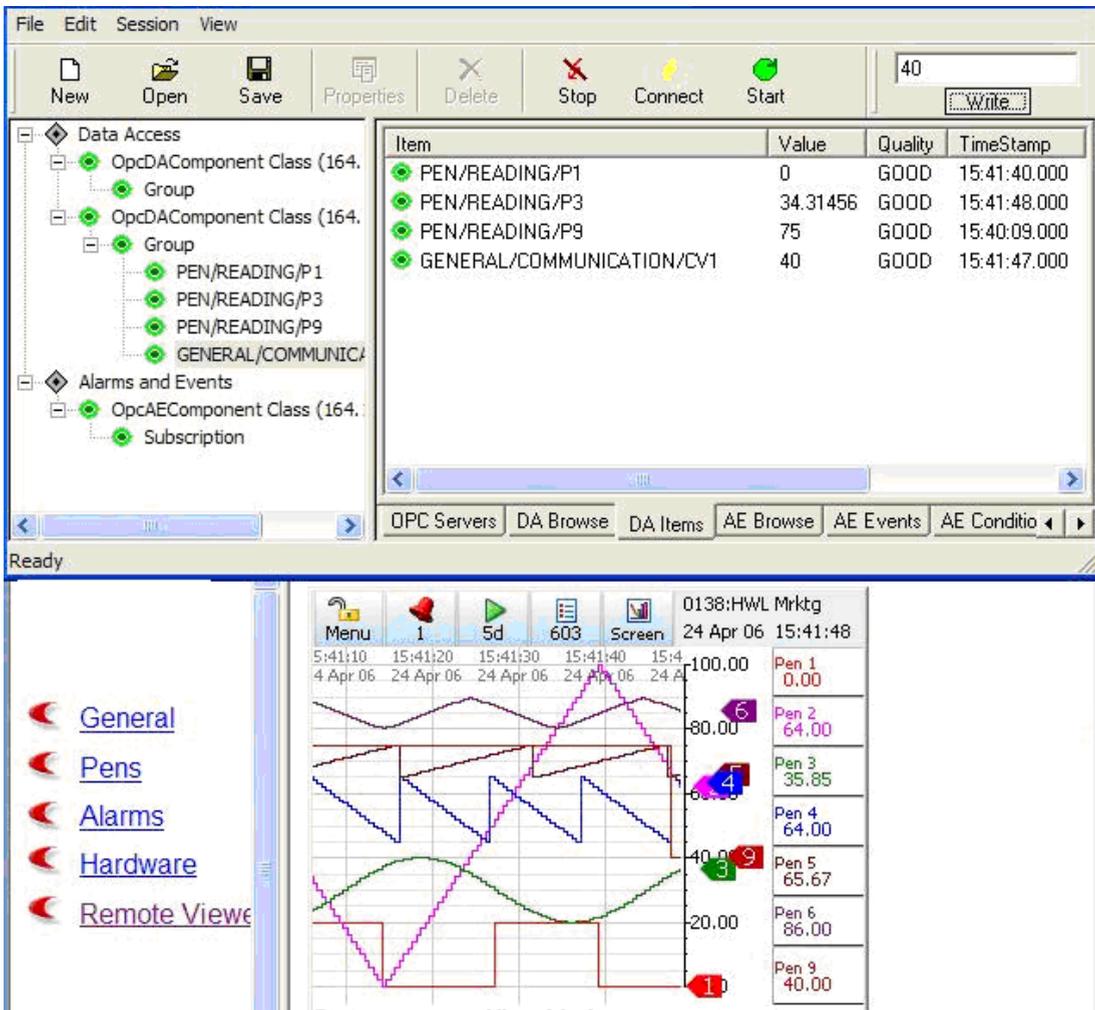
For viewing the Alarm data, click on the “**AE Conditions**” tab; this will show the real time alarms that are occurring. The figure shows Pen 1 being in alarm and the acknowledgement of a previous alarm on Pen 10.



**Softing OPC Toolbox Demo Client Viewing the Real Time Events**

As indicated previously, the OPC Client can write as well read values. The example below has been set up to write a value of 40 to a General/Communication/CV1 parameter.

- In the “**DA Items**” tab, the recorder has been set up with a Pen on the recorder to be a Communications Value (Pen 9 = CV1).
- The display below shows the OPC Client display along with the Remote Viewer window from the recorder.
- To write a value from the OPC Client to the recorder, the **GENERAL/COMMUNICATION/CV1** is first highlighted, the parameter to be written is entered in the box in the upper right, above the “Write” box.
- Click on the “**Write**” box; the OPC Client writes the value of 40 to the Recorder’s CV1 (i.e. PEN 9). Looking at the recorder’s remote display, you can see Pen 9, which was set up as a communications value change from 75 to 40.
- On the next scan of the OPC Client (not shown), the PEN/READING/P9 value changes from the 75 shown here to 40, completing the cycle.



Softing OPC Toolbox Demo Client Writing to CV1 – PEN 9

### Summary

The integral OPC Server of the **QX** and **SX** recorder makes it easy to acquire real time data along with Alarms and Event without creating special drivers or custom software. A standard OPC Client can be connected directly to the recorder, eliminating the need for intermediate software packages with the added complexity and cost.