DIONEX

Setting Up Chromeleon-PA

(Includes Chromeleon-PA OPC Interface Setup)

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Chromeleon-PA Setup

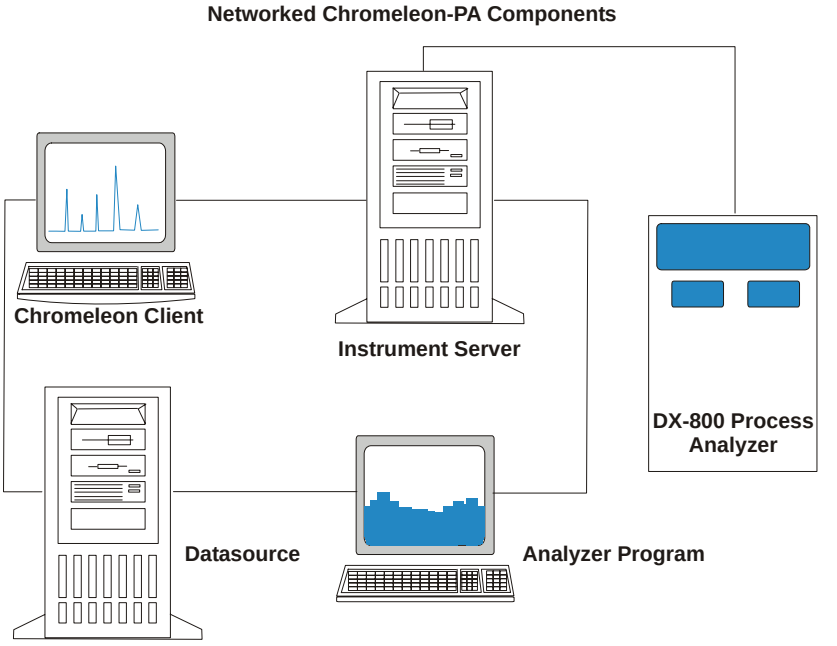
1. About Chromeleon-PA

Dionex Chromeleon®-PA is a client/server-based chromatography data system that provides software control of the DX-800 Process Analyzer. Chromeleon-PA extends the Chromeleon chromatography data system by adding process monitoring functions to the standard Chromeleon chromatography functions. Process monitoring functions include sample stream selection, sample preparation and analysis, configuration of alarms and conditional responses, and component data trending.

These are the Chromeleon-PA main components:

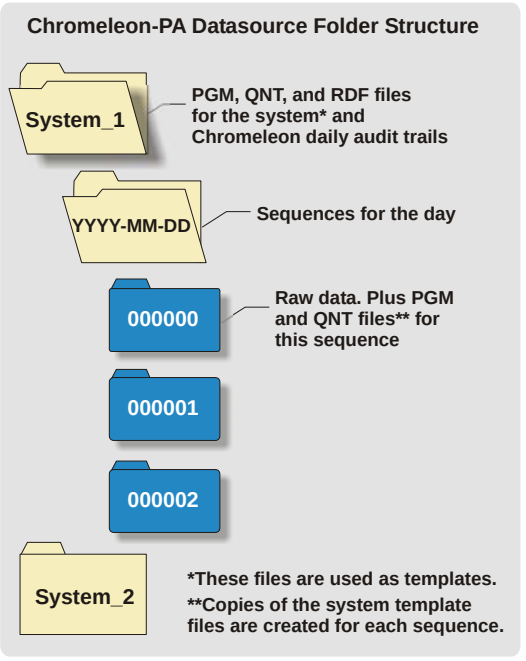
- Chromeleon Server Configuration program—This program contains configuration information about the chromatography instrument systems that are in the DX-800 Process Analyzer.
- Chromeleon Instrument Server—The server controls the data exchange between the DX-800 Process Analyzer and the Chromeleon-PA computer.
- Chromeleon Server Monitor program—This program is required for starting and monitoring the chromatography server.
- Chromeleon program—This program is the Chromeleon client user interface for accessing chromatography data and for controlling individual chromatography instruments.
- Datasource—This is the database in which Chromeleon-PA data is stored.
- Analyzer program—This program is the user interface for accessing process analytical functions. This includes all analyzer-level configuration, control, results display, and results reporting. This program is unique to Chromeleon-PA.
- Chromeleon-PA OPC Interface (Optional)—The Chromeleon-PA OPC (OLE for Process Control) Server allows access to, and limited control of, one or more DX-800. See Appendix A for a description of OPC and setup instructions

The above programs, as well as the datasource and instrument server can be installed on a single computer or on separate computers, as in the following example:



2. The Chromeleon-PA Folder Structure

Chromeleon-PA can be attached to only one datasource at a time. All data (including sample data, the Audit Trail, the Analyzer program Event Log, report templates, alarm configurations, and so on) is stored and retrieved from this datasource. Chromeleon-PA creates the folder structure of the datasource.



When you configure timebases (systems) in the Server Configuration program, Chromeleon creates a top-level folder in the datasource for each configured system. All programs (PGM files), methods (QNT files), and report templates (RDF files) for a system must be stored in this top-level folder. These are the templates used in daily operation as described below.

During daily operation, when the analyzer begins the first sequence of the day, Chromeleon-PA creates a new folder under the system top-level folder and names it with the current year, month, and day. All sequences started on that day are then placed in this subfolder. Each sequence is named with a 6-digit number to ensure uniqueness. Output PGM and QNT files, which are copied from the template versions located in the top-level folder, are also stored in the sequence folder.

3. System Requirements

System requirements for Chromeleon-PA are the same as for Chromeleon versions without process monitoring functions. Refer to *Installing the Chromeleon IC System* (Document No. 031883) for details.

4. Setup Overview

This section provides an overview of the tasks that must be completed before you can begin using Chromeleon-PA to control the DX-800 Process Analyzer. Details about each step follow this overview.

1. If it was not already installed at the factory, install Chromeleon and any appropriate service packs (Section 5).
2. Start the Chromeleon server (Section 5).
3. Enter the license information (Section 5).
4. Connect the system modules (CC80 Component Controller, analytical pump, detector, etc.) to the data system (Section 5).
5. Complete the following steps in the Server Configuration program:
    a. Create timebases (systems) (Section 6).
    b. Configure the system modules (Section 6).
    c. If a system includes multiple modules of the same type, assign unique names to the devices (Section 6).
6. Complete the following steps in the Chromeleon client:
    a. Open control panels for each system (Section 7).
    b. Verify that Chromeleon is communicating with all systems and the systems are functioning correctly (Section 7).
    c. Create program (PGM) files (Section 8).
    d. Create method (QNT) files (Section 9).
    e. Create report definition (RDF) files (Section 10).

    Notes:

    - Save all PGM, QNT, and RDF files in the top-level system folder in the datasource. For example, if you create PGM, QNT, and RDF files for a system named System_A, save all of the files in the System_A folder in the datasource.
    - When setting up method files for system calibration, you will need to create sequences in the Chromeleon-PA client. However, for routine analyzer runs, the Analyzer program is used to create and control sequences.

7. Run the Chromeleon-PA Analyzer Setup program (Section 11).
8. Start the Analyzer program (Section 12).
9. Connect to the datasource in which the program, method, and report files for the analyzer systems are stored (Section 13).
10. Connect to the Chromeleon instrument server that controls the analyzer systems (Section 14).
11. (Optional) Run the Chromeleon-PA OPC interface Setup program and then see Appendix A for setup instructions.

5. Running the Chromeleon Setup Program and Entering the License

Follow the instructions in *Installing the Chromeleon IC System* (Document No. 031883) to complete the following steps:

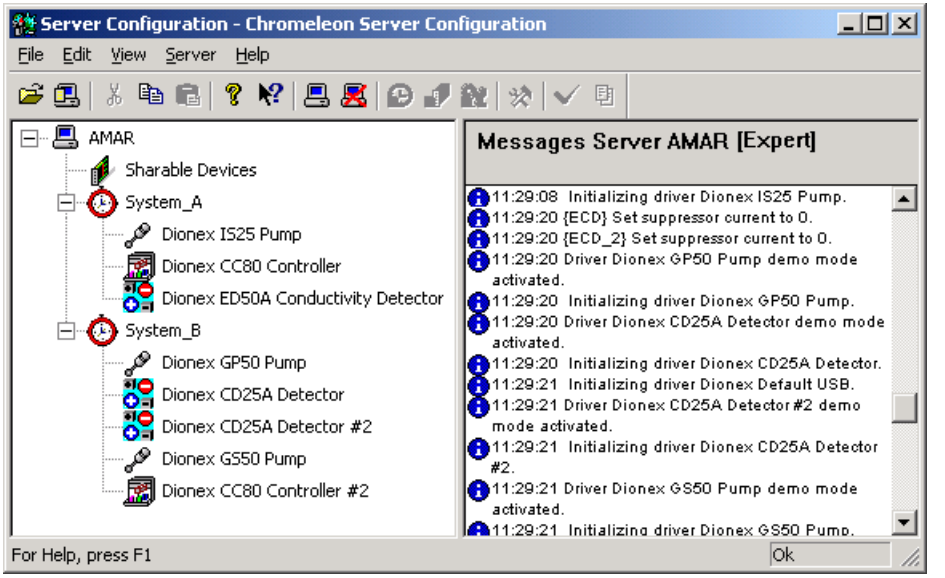
1. Run the Chromeleon Setup program from the setup screen, which should start automatically when the Chromeleon CD is inserted into the PC.
2. Install any appropriate Chromeleon Service Packs. Refer to the release notes for the latest information.
3. Start the server.
4. Enter the license information.
5. Connect the devices (CC80, analytical pump, detector, etc.) to the data system network.

6. Creating Timebases and Configuring Devices

The number of timebases (systems) needed and the devices included in each timebase depend on your hardware configuration and the application(s) to be run. In addition to a CC80 Component Controller, which *must* be included, an analyzer system often includes an analytical pump, a detector, and an SS80 Sample Selector.

6.1 Creating Timebases

In the Chromeleon Server Configuration program, create timebases and add devices as required for your hardware configuration. See the Chromeleon Help topic “How to...: Actions in the Server Configuration” for detailed instructions. The example configuration below shows two defined timebases: System_A includes one CC80, one analytical pump, and one detector. System_B includes one CC80, two analytical pumps, and two conductivity detectors.

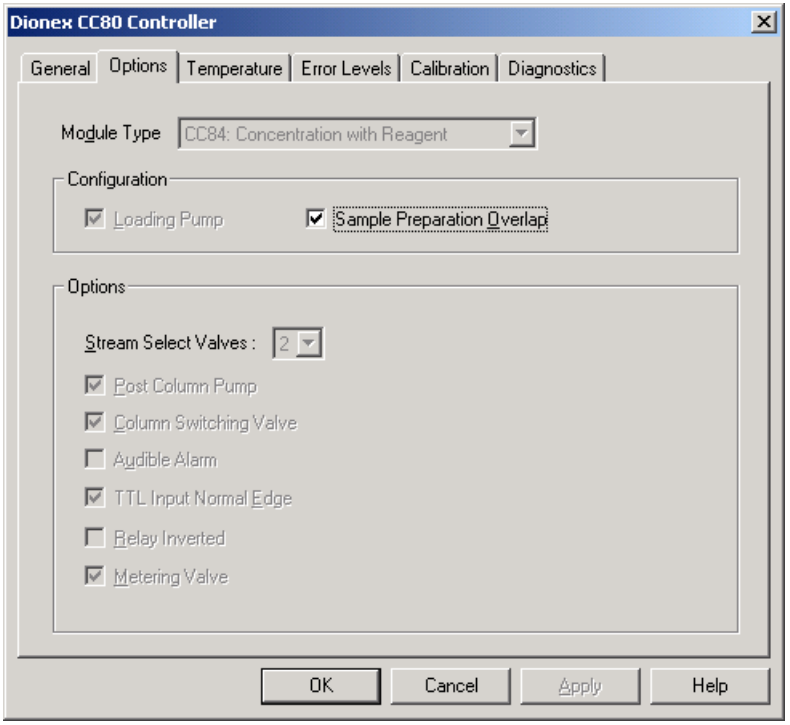


6.2 Configuring Devices

When you add a device to a timebase, enter the configuration properties as required for the device. Click the **Help** button on each tab page for details about the properties shown on the page. The example below shows the CC80 **Options** tab page.

On the CC80 Options page, the Sample Preparation Overlap option is the only option you can set. The Server Configuration program automatically sets all other properties on the page.

NOTE **If the options are enabled, it indicates the CC80 is in Demo mode. If this occurs, check the settings on the General tab page. Also, verify that the CC80 is on and connected to the Chromeleon data system network.**



6.3 Assigning a Unique Name to Each Device

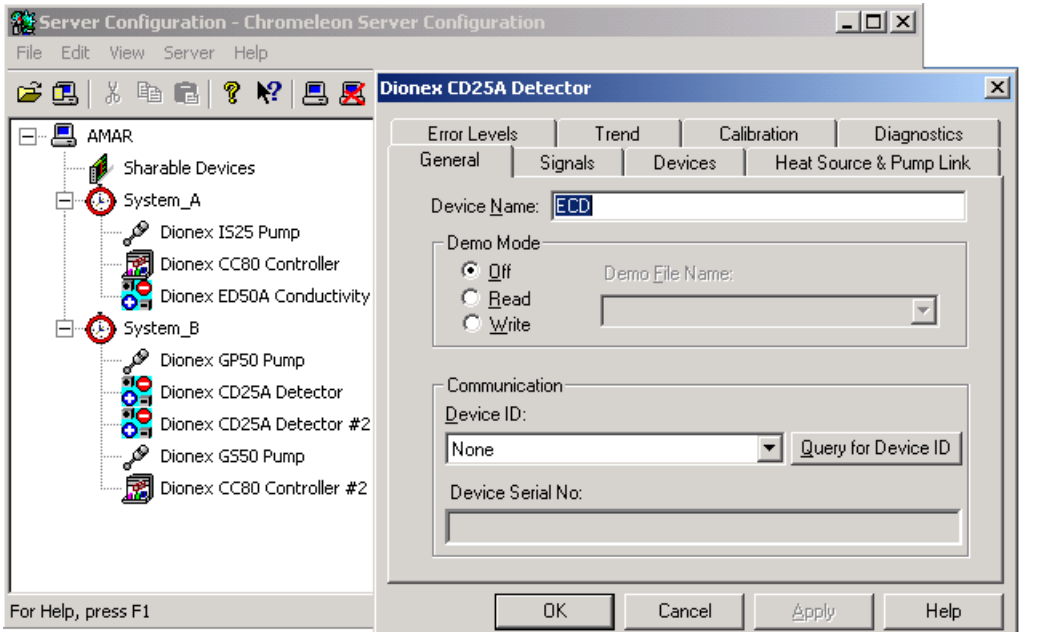
When you add a device to a timebase, the Chromeleon Server Configuration program assigns a default name to the device. For example, a CC80's default device name is Controller, an analytical pump's device name is Pump, and a conductivity detector's device name is ECD.

In most cases, you can accept the default names assigned by Chromeleon. However, if you set up a timebase that includes multiple devices of the same type (as in the System_B example described in Section 6.1), you will need to edit the device names to ensure that each device in the timebase has a unique name.

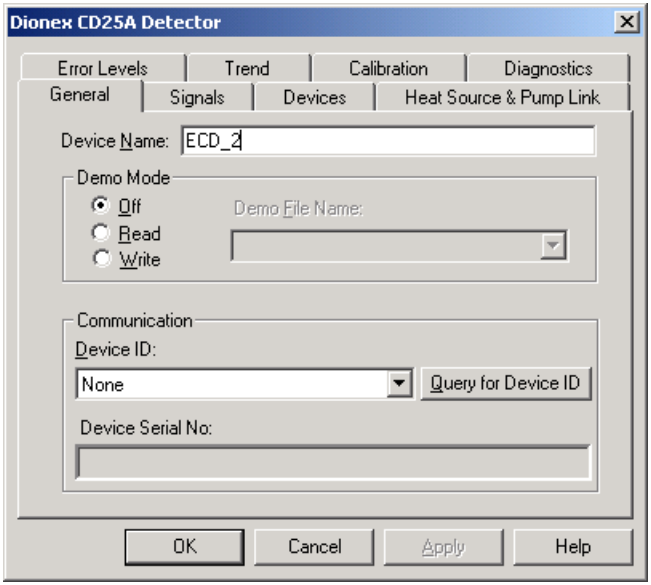
Notes for timebases with a shared CC80:

- Because all of the devices sharing the CC80 are in the same timebase, if one device stops, all of the devices will stop.
- A single QNT file is required for all devices sharing the CC80. The QNT file is set up with components based on detector channels. See Section 9.2 for details.

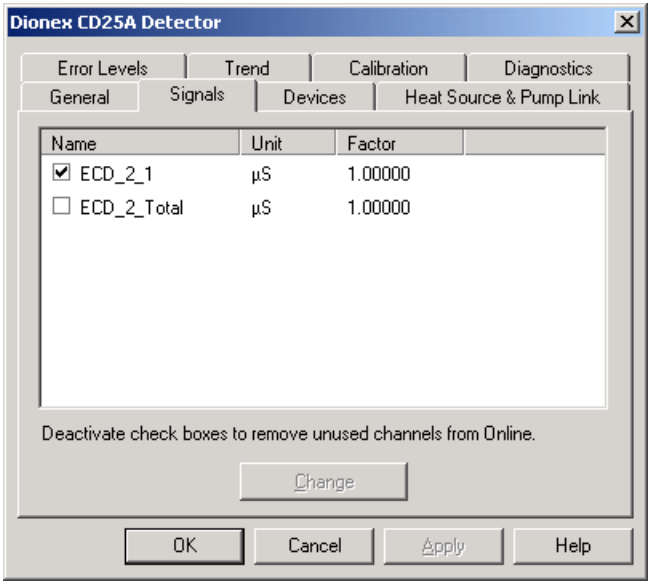
The following example shows the **General** tab page for CD25A Detector #2 in the System_B timebase. The device name is **ECD**, which is the same name assigned to CD25A Detector #1.

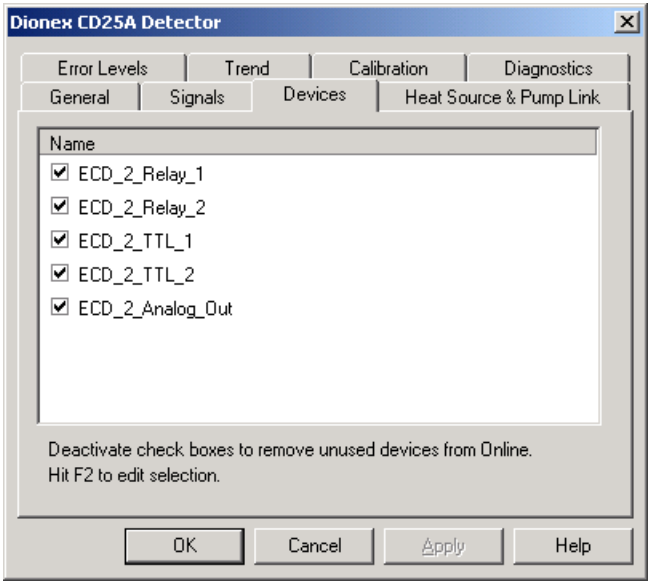


To assign a unique name to this detector, append an underscore and a **2** to **ECD**. The device name is now **ECD_2**. See the example below.



The device name also appears on the **Signals** and **Devices** tab pages. Append **_2** to the device name on those pages also. See the examples below.





7. Opening a Control Panel

Dionex provides default control panels for monitoring the status of system instruments and for controlling instrument functions when the system is offline. To open a control panel, go to the Chromeleon Browser and open the **Dionex Templates/Panels/Dionex_IC/DX-800** folder. Double-click the panel that matches the instrument configuration for your system.

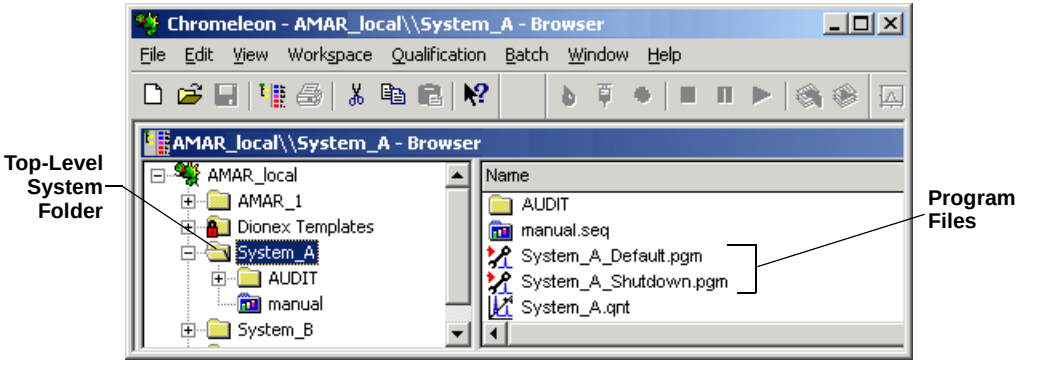
To connect the system to the panel, select **Control >Connect to Timebase**. A dialog box appears. Select the timebase from the list and click **OK**.

8. Creating Program (PGM) Files

In Chromeleon, use the Program Wizard to create new program files for the analyzer systems, or to edit existing programs. See the Chromeleon Help topic "How to...: Actions in the PGM Editor" for detailed instructions.

When you save the program files, save them in the top-level folder of the system for which the program was created. The Analyzer program only accesses programs from this top-level folder. If the files are in a different folder, they will not be available in the Analyzer program. See Section 2 for details about the Chromeleon-PA folder structure.

In the example below, two program files were created for System_A and saved in the System_A top-level folder.



8.1 Creating Programs for Different System Functions

In addition to creating programs for sample analyses, you will also want to create programs to control other types of system functions (for example, system shutdown). The Analyzer program lets you assign the following four types of programs to a system:

Program Type	Used For
Default	Running sample analyses
Standby	Placing a system in standby
Shutdown	Shutting down a system
Overlap Flush	Flushing when a sequence is interrupted (for example, if an alarm occurs)

The Chromeleon Program Wizard is designed primarily for creating programs for sample analyses (default). Default programs include commands for injection and data acquisition, which are not used with the Standby, Shutdown, and Overlap Flush programs. When you use the Program Wizard to create a Standby, Shutdown, or Overlap Flush program, delete the following commands from the program after completing the Wizard:

- Autozero
- ECD_1.AcqOn
- ECD_1.AcqOff

8.2 Example Programs

Chromeleon-PA provides example program files, which you can refer to when creating programs for your analyzer. Because every program is created for a specific system and application, the examples will not work “as is” with your analyzer, but the principles behind the types of commands included and the order in which they are listed can be applied to many systems. See Appendix B for printouts and descriptions of the example programs.

The example programs are included in the **CM-PA Example** datasource on the Chromeleon-PA installation CD. To connect to the datasource and view the examples, insert the CD into the drive, go to the Chromeleon Browser, and select **File>Mount Datasource>Browse**.

9. Creating Method (QNT) Files

In Chromeleon, create new method files or edit existing files. Section 9.1 provides a brief description of the steps required and the settings recommended for Chromeleon-PA. Refer to the Chromeleon Help topic “How to...: Actions in the QNT Editor” for detailed instructions.

After creating the QNT files, save them in the top-level system folder to be used as templates by the Analyzer program. See Section 2 for details about the Chromeleon-PA folder structure.

Updating the Calibration

During daily operation, when the Analyzer program runs a sequence, it copies the template method (QNT) file from the system’s top-level program and saves it with the sequence. If a sequence includes calibration standards, both the sequence copy of the method and the template method are updated. This ensures that the updated calibration information is used for all subsequent sequence runs on that system.

9.1 Overview of Creating Method Files for Chromeleon-PA

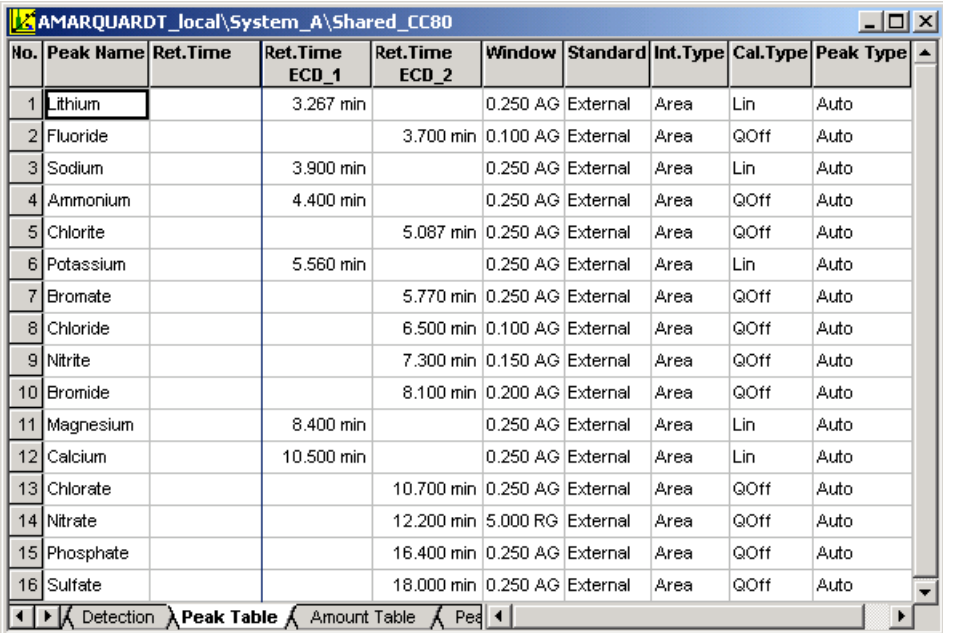
Complete the following steps in the Chromeleon client.

1. Create a new method file (select **File>New>Method File**) or copy one of the example files included in the **Dionex Templates>IC Applications** folders and modify it as required for your system.
2. In the QNT Editor, select the **General** tab page, and select the **Fixed** Mode under **Global calibration settings**.
3. Create a sequence that runs the desired number of levels and replicates of the calibration standards.
4. Run the standards.
5. In the QNT editor, select the **Calibration** tab and add the standards to the table (right-click and select **Insert Standard**).
6. On the **Amount Table** tab page, enter the amounts of the components in the standard.
7. On the **General** tab page, click the **Calibrate** button to generate the calibration curve and parameters.
8. Save the calibrated method file in the top-level folder for the system.

9.2 Creating a Method File for Systems Sharing a CC80

If your configuration includes a timebase with multiple detectors sharing a CC80, you will need to create a single method file with all components for each detector channel included in one component list. To do this, use the **Duplicate Column** command on the **Peak Table**, **Amount Table**, and **Peak Tracking** pages of the method to create a separate retention time column for each detector. See the Chromeleon Help topic, "How to...: Actions in the QNT Editor: Defining the QNT Method for Several Detectors" for detailed instructions.

In the following example Peak Table, the Peak Name column includes the components from two detector channels: one for cations and one for anions. Two extra retention time columns were added using the **Duplicate Column** command. The Ret. Time ECD_1 column is associated with the cation detector channel and displays only the cations. The Ret. Time ECD_2 column is associated with the anion detector channel and displays only the anions.



AMARQUARDT_local\System_A\Shared_CC80

No.	Peak Name	Ret.Time	Ret.Time ECD_1	Ret.Time ECD_2	Window	Standard	Int.Type	Cal.Type	Peak Type
1	Lithium		3.267 min		0.250 AG	External	Area	Lin	Auto
2	Fluoride			3.700 min	0.100 AG	External	Area	QOff	Auto
3	Sodium		3.900 min		0.250 AG	External	Area	Lin	Auto
4	Ammonium		4.400 min		0.250 AG	External	Area	QOff	Auto
5	Chlorite			5.087 min	0.250 AG	External	Area	QOff	Auto
6	Potassium		5.560 min		0.250 AG	External	Area	Lin	Auto
7	Bromate			5.770 min	0.250 AG	External	Area	QOff	Auto
8	Chloride			6.500 min	0.100 AG	External	Area	QOff	Auto
9	Nitrite			7.300 min	0.150 AG	External	Area	QOff	Auto
10	Bromide			8.100 min	0.200 AG	External	Area	QOff	Auto
11	Magnesium		8.400 min		0.250 AG	External	Area	Lin	Auto
12	Calcium		10.500 min		0.250 AG	External	Area	Lin	Auto
13	Chlorate			10.700 min	0.250 AG	External	Area	QOff	Auto
14	Nitrate			12.200 min	5.000 RG	External	Area	QOff	Auto
15	Phosphate			16.400 min	0.250 AG	External	Area	QOff	Auto
16	Sulfate			18.000 min	0.250 AG	External	Area	QOff	Auto

Detection | Peak Table | Amount Table | Pea

NOTE **If two anion (or two cation) detector channels were being used, the measured retention time for each anion (or cation) would appear in both Ret. Time columns.**

10. Creating Report Definition Files (RDF)

In Chromeleon, create report definition files to define the contents of reports printed from the Analyzer program. See the Chromeleon Help topic, “Report Templates” for detailed instructions.

As with program and method files, save all report files in the top-level folder of the system for which the report will be used.

10.1 Report Types

The following two basic types of reports are used with Chromeleon-PA:

Report Type	Used For
Sample (end-of-run)	Printing the results of sample analysis at the end of each injection run. These reports typically include a chromatogram, a table containing information (height, area, amount, etc.) about each peak in the chromatogram, calibration curves and tables, and peak analysis information (height, width, type, resolution, etc.).
Scheduled (trend)	Printing reports at scheduled intervals. These reports typically include trend data plots (for example, a plot of the peak height obtained for a particular component over the last 24 hours).

10.2 Example Reports

Chromeleon-PA provides example reports, which you can copy to your system folders and modify for your needs. The report files are available in the Chromeleon Browser in the **Dionex Templates>Reports** folder.

11. Running Chromeleon-PA Analyzer Setup

Stop Chromeleon Server before running setup. Then, go to the **CMPA** folder on the Chromeleon-PA CD-ROM and double-click **Setup.exe**. Follow the on-screen instructions as they appear.

12. Starting the Analyzer Program

Verify that the Chromeleon Server is running and then select **Start>Programs>Chromeleon>Analyzer**.

13. Connecting to the Datasource

When the Analyzer program starts the first time, you are asked to connect to a datasource. A dialog box shows the available datasources. Select the datasource in which the analyzer system folders are located. Click **Make Current**.

14. Connecting to the Instrument Server

To connect to the Chromeleon instrument, select **Administration>Instrument Server**. The **Connect to Chromeleon Server** dialog box appears. Select the server from the list and click **OK**.

15. Configuring Analyzers, Systems, and Streams

Follow the instructions in the *Chromeleon-PA Analyzer User's Guide* (Document No. 031964) or the Help to configure analyzers, systems, and streams, and to create analyzer sequences.

A • The Chromeleon-PA OPC Interface

OPC (OLE for Process Control) is a series of standards specifications that enables open connectivity in industrial automation. The optional Chromeleon-PA OPC Server includes two interface specifications[1]:

- The *OPC Data Access* (DA) interface moves real-time data.
- The *OPC Alarms and Events* (AE) interface provides notification of alarms and events on demand (in contrast to the continuous data flow of the Data Access interface).

Installation of the Chromeleon-PA OPC Server allows access to, and limited control of, one or more DX-800 Process Analyzers by an external OPC-compatible program (the *client*). The OPC client will use DX-800 data and/or alarm and event information for custom applications.

This appendix contains instructions for the following tasks:

Section A.1	Setting up the OPC Data Access interface; states and commands are provided in Section A.2
Section A.3	Setting up the OPC Alarms and Events interface
Section A.4	Gathering results at the end of a sample
Section A.5	Setting up remote access of the OPC server

You can find more information about OPC at http://www.opcfoundation.org/.

1. The Chromeleon-PA OPC specifications are based on the Axeda FactorySoft OPC™ Toolkit.

A.1 Data Access (DA) User Interface

This section explains how to establish communication between the DX-800 and the OPC client and how to select DA tags and assign numeric values to them. A *tag* is any aspect of the analyzer or system that the OPC Server can monitor or control; this includes sequences, sample streams, device states, report variables, and status messages.

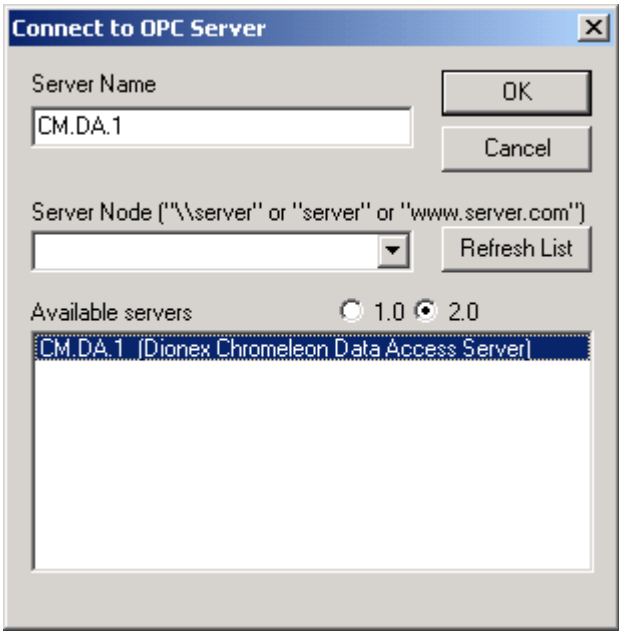
1. Start the Chromeleon Server Monitor program, and then start the Analyzer program.
2. Start the Chromeleon-PA OPC Server. Each time the OPC Server is started, the list of tags is rebuilt. The time required to complete this process varies, depending on the number of tags. When the list is complete, the OPC icon appears on the taskbar.
3. When the OPC icon appears on the taskbar, start the OPC Data Access (DA) client.

   The main window of the DA client appears.

   NOTE The Dionex DA client is simply an example of an OPC client; it provides access to the Chromeleon-PA OPC Server and enables you to view certain features, but is not linked to any other programs. After your own OPC client is installed, it will be connected to the Chromeleon-PA OPC Server as explained in the following steps.

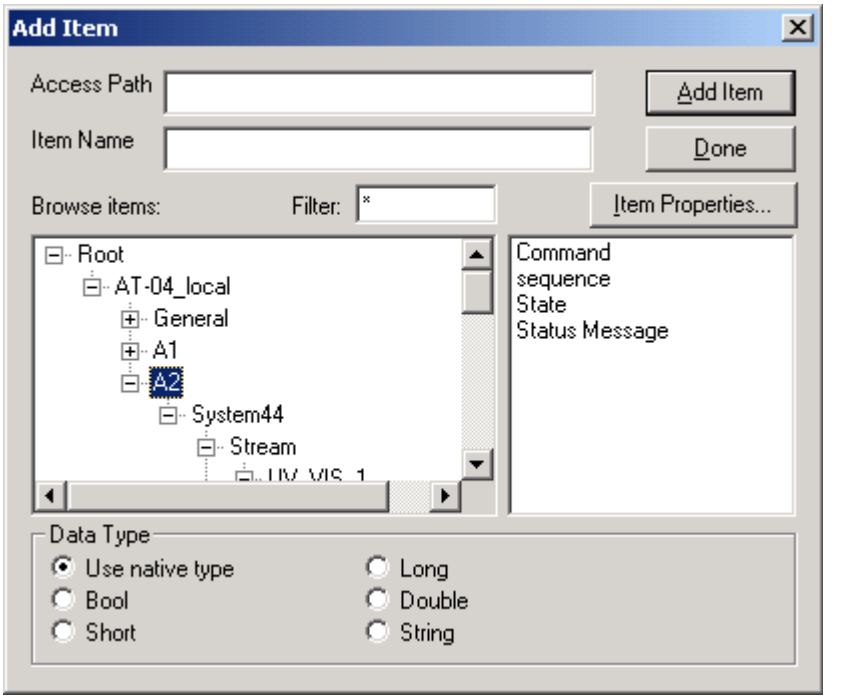
4. Select **Connect…** on the **OPC** menu.

The **Connect to OPC Data Access Server** dialog box appears.



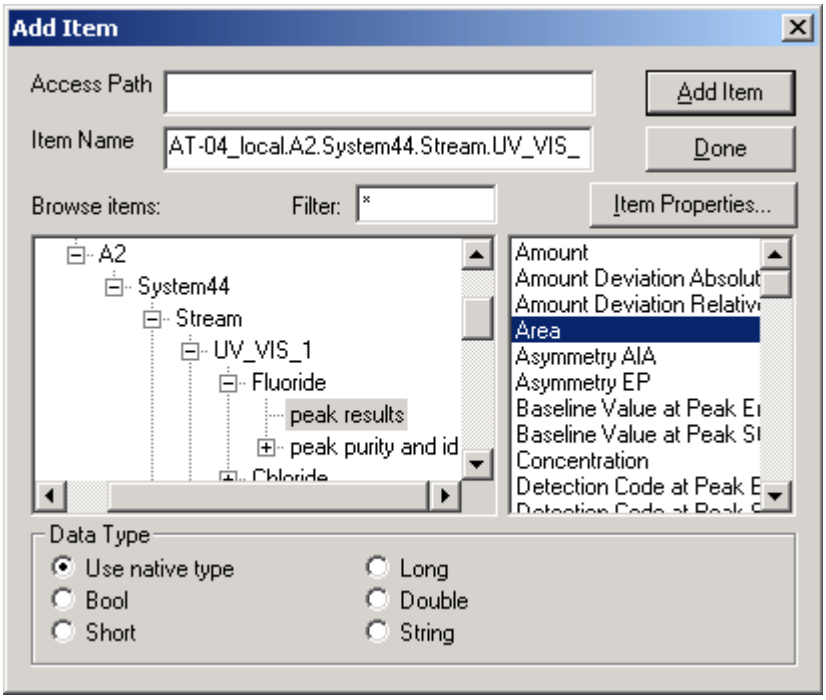
5. Select the Dionex Chromeleon Data Access Server from the **Available servers** list and click **OK**.
6. Select **Add Item…** on the **OPC** menu.

The **Add Item** dialog box appears. The following screen shot shows the top level of the tree in the **Browse items** window. The default state is that no tags are selected.



Use the scroll bar at the right of the **Browse items** window to navigate the tree; click the + sign preceding an item to display the items below it.

The following screen shot indicates some additional levels in the tree.

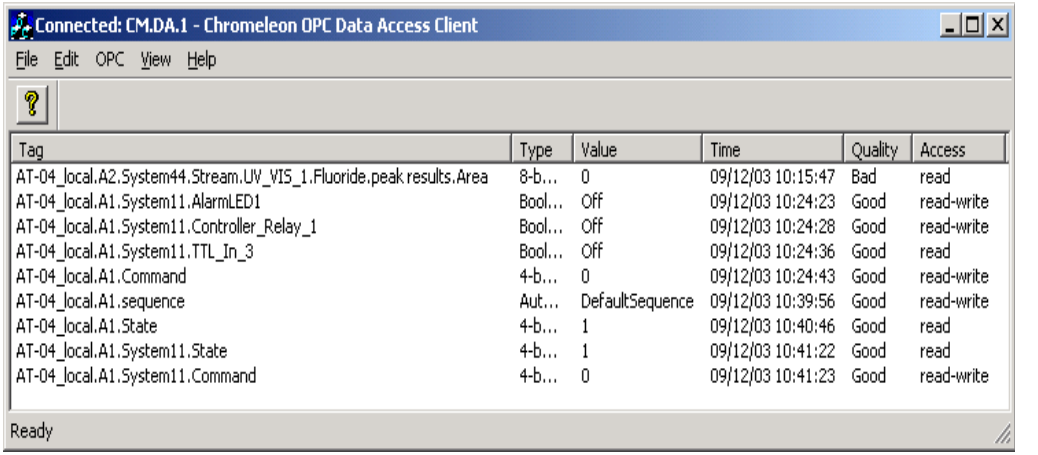


7. Select an item in the **Browse items** window to display a list of related tags in the window to the right. To select a tag, double-click the tag name or click the **Add Item** button. To view additional information about a selected tag, click the **Item Properties...** button.

   NOTE For an explanation of which tags to select to gather results at the end of a sample, see Section A.4.

8. When you finish selecting tags, click **Done**.
9. If you want to retain this list of tags for use in the future (and avoid repeating the selection process), select **Save** on the **File** menu. This opens a standard Windows-style dialog box. Select a path and name for the configuration file and click **OK**.

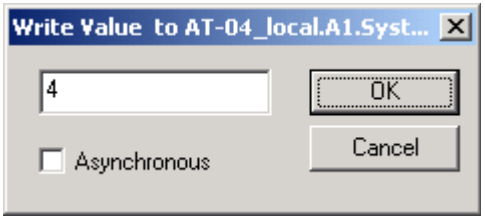
10. The main window of the DA client now displays the tags you selected. The window will resemble the following example.



NOTE **If the quality of a selected tag is "Uncertain," refer to the "Category Tables" section on the following page for more information.**

11. Select any tag with write permission (as indicated in the **Access** column) and then select **Write Value to Item…** on the **OPC** menu.

    The **Write Value to** dialog box appears.



12. After referring to the tables in Section A.2, type an appropriate value for the tag in the space provided and click **OK**.

NOTE **Do not select the Asynchronous check box.**

13. Continue assigning values to tags in the DA client window.

Category Tables

Each implemented category includes a *table tag* that provides the category's names and values as a VT_VARIANT array (or table), using the following format:

```
<"variable name"><variable value ><"next variable name"><next
variable value>. . .
```

The variable name is always text. The variable value is the original tag value and type, with no conversions that might be applied to a non-table tag. The last elements in the table are the table tag name, followed by the number of variables in the table (represented as a four-byte signed integer). Tables are initialized to the table tag name followed by a size of 2; they are empty except for the name and size. When the category is updated, the table is sized accordingly.

Under certain circumstances, numerical results will return the text "n.a." (For example, if a peak is not found, the Amount is returned as n.a.) If this occurs, the numerical results are converted to the minimum negative value of the type (floating point = -2.2250738585072014e-308, integer = -2147483648) and the quality of the tag is set to OPC_QUALITY_UNCERTAIN.

> **NOTE The variable value is not converted to the minimum negative value of the type.**

To determine the actual value returned by Chromeleon, look at the table tag:

1. Select the tag name in the DA client window.
2. Select **Edit** on the **Copy** menu (or press Ctrl-C).
3. Paste the contents of the table into Notepad (or other text editor). Scroll through the file to the tag of interest.

A.2 States and Commands

A.2.1 Analyzer.State

Analyzer State	Code	Definition
Ready	1	Analyzer ready to run.
Running	2	Analyzer running sequences.
Standby	3	All channels are in standby state. If standby methods were assigned, they are run or are being run.
Standard	4	Running calibration sequences.
Validate	5	Running check standard sequences.
Alarm Schedule	6	Running alarm schedule.
Re-run	8	Re-running sample.
Running RBE Sequence	9	Running result-based event sequence.

A.2.2 Analyzer.Command and Sequence

Command	Code	Definition
Start	0	Use in conjunction with analyzer-level sequence tag. The sequence tag is assigned a sequence, and then the analyzer command is set to 0.
Sequence End	1	End current sequence at end of sequence (stop looping).
Sample End	2	End current sequence at end of currently running sample.
Abort	3	Abort current sequence immediately.
Resume	4	Restart systems in standby.
Standby End of Sequence	5	Put analyzer into standby at end of sequence.
Standby End of Sample	6	Put analyzer into standby at end of sample.
Standby	7	Put analyzer into standby immediately.

Sequence	Sequence name as an alpha-numeric string. Can be a word, integer, or combination. Enter the sequence that is to be started. If no sequence is entered, the default sequence is run.

A.2.3 System.State

System State	Code	Description
Ready	1	Sequence is not running.
Running	2	Sequence is running.
Standby	3	System is in standby state.
Shutdown	7	System shutdown, or not available.
Standard	4	Running calibration.
Validate	5	Running check standard.
Re-run	8	Re-running sample.
Running RBE Sequence	9	Running result-based event sequence.

A.2.4 System.Command

Command	Code	Definition
Sequence End	1	End system sampling at end of sequence (stop looping).
Sample End	2	End system sampling at end of currently running sample.
Abort	3	Abort system sampling immediately.
Resume	4	Restart system if in standby.
Standby End of Sequence	5	Put system into standby at end of sequence.
Standby End of Sample	6	Put system into standby at end of sample.
Standby	7	Put system into standby immediately.

Relay and Front Panel Commands

Function	Code	Definition
Relay 1 or Relay 2	-1	Turn on (close) the corresponding relay.
Relay 1 or Relay 2	0	Turn off (open) the corresponding relay.
Alarms 1–4	-1	Turn on the corresponding front panel LED.
Alarms 1–4	0	Turn off the corresponding front panel LED.

A.3 Alarms and Events (AE) User Interface

This section explains how to establish communication between the DX-800 and the OPC client and how to specify which alarms and events will be reported to the OPC client. Alarms and events include the following: process alarms, operator actions, informational messages, and tracking/auditing messages.

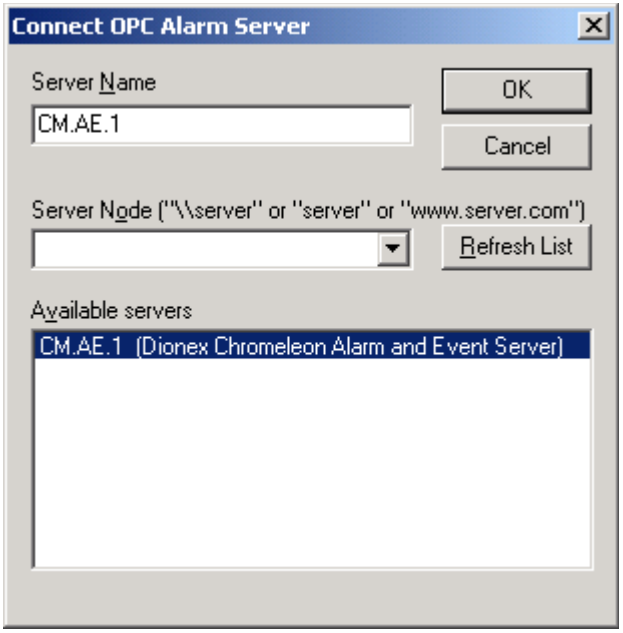
1. Start the Chromeleon Server Monitor program, and then start the Analyzer program.
2. Start the OPC Server. Each time the OPC Server is started, the list of tags is rebuilt. The time required to complete this process varies, depending on the number of tags. When the list is complete, the icon appears on the taskbar.
3. When the OPC icon appears on the taskbar, start the OPC Alarms and Events (AE) client.

   The main window of the AE client appears. Disregard the **Condition** and **Subcondition** columns (these features are not applicable to Chromeleon).

NOTE **The Dionex AE client is simply an example of an OPC client; it provides access to the Chromeleon-PA OPC Server and enables you to view certain features, but is not linked to any other programs. After your own OPC client is installed, it will be connected to the Chromeleon-PA OPC Server as explained in the following steps.**

4. Select **Connect…** on the **OPC** menu.

   The **Connect to OPC Alarm Server** dialog box appears.

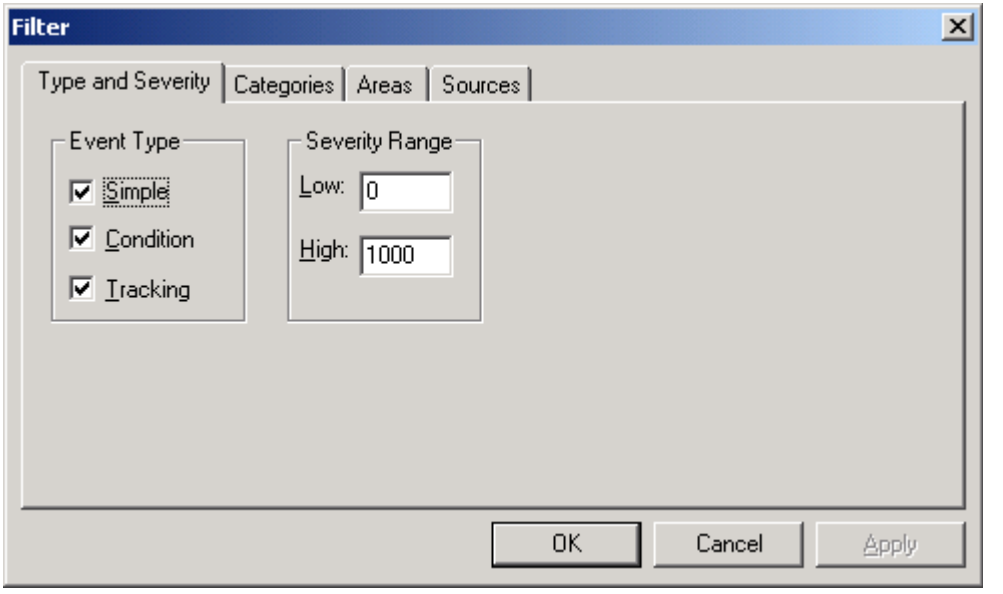


5. Select the Dionex Chromeleon Alarms and Events Server from the **Available servers** list and click **OK**.

6. Select **Filter** on the **OPC** menu.

   The **Filter** dialog box appears. The dialog box contains four tab pages. Use the controls on each tab page to determine which parameters will generate events and be reported to the OPC client. Any parameters not selected here will be filtered out.

   NOTE For an explanation of which tags to select to gather results at the end of a sample, see Section A.4.



7. By default, all three check boxes under **Event Type** are selected. If there is a certain type of event that you do not want to be reported, clear the corresponding check box.

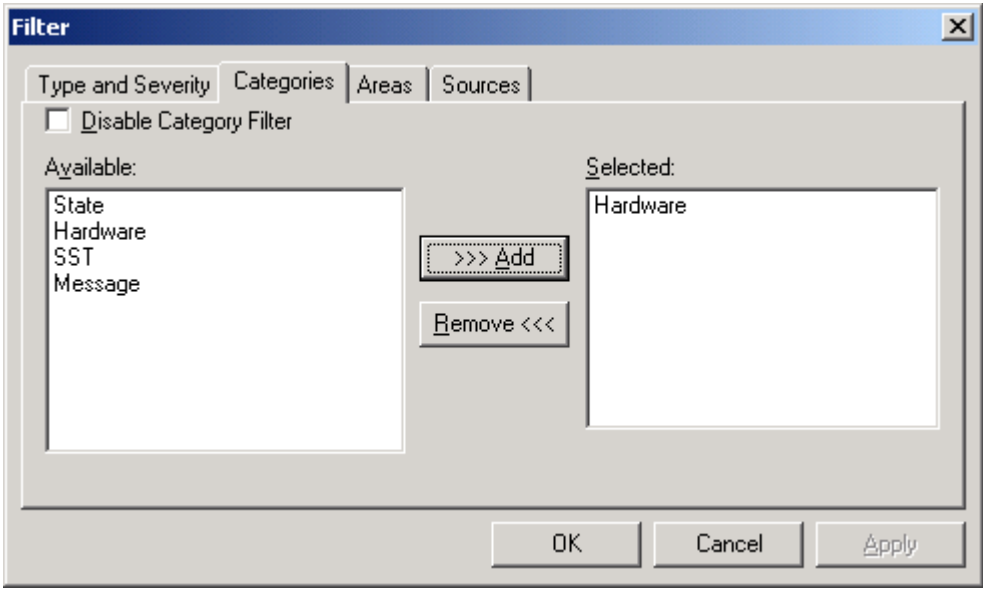
   NOTE All Chromeleon-PA events are the Simple type.

8. Under **Severity Range**, enter the **Low** and **High** values. Events within this range will be reported. The table below lists the severity levels for tags.

Tag	Severity Level
Chromeleon-PA Status Message	900 (occurs when the analyzer configuration is changed)*
TTL Alarm	600
Hardware Alarms: • LoadingPumpCavitate • DilutePumpCavitate • SS80_LeakDetected • SP80_LeakDetected • SP80_LeakRecalibrate • TemperatureState	600
System Shutdown	800
Analyzer Standby	700
Normal Sample Complete	200
Sample Premature Termination and Sequence End	900
System Suitability Test Results Fail	800

* When the configuration is changed, the quality of all tags except the Chromeleon-PA status is set to QUALITY_CONFIG_ERROR, and updates stop. The top-level Chromeleon-PA status tag will provide an event, using the following message text: “Analyzer configuration changed.”

9. Select the **Categories** tab.

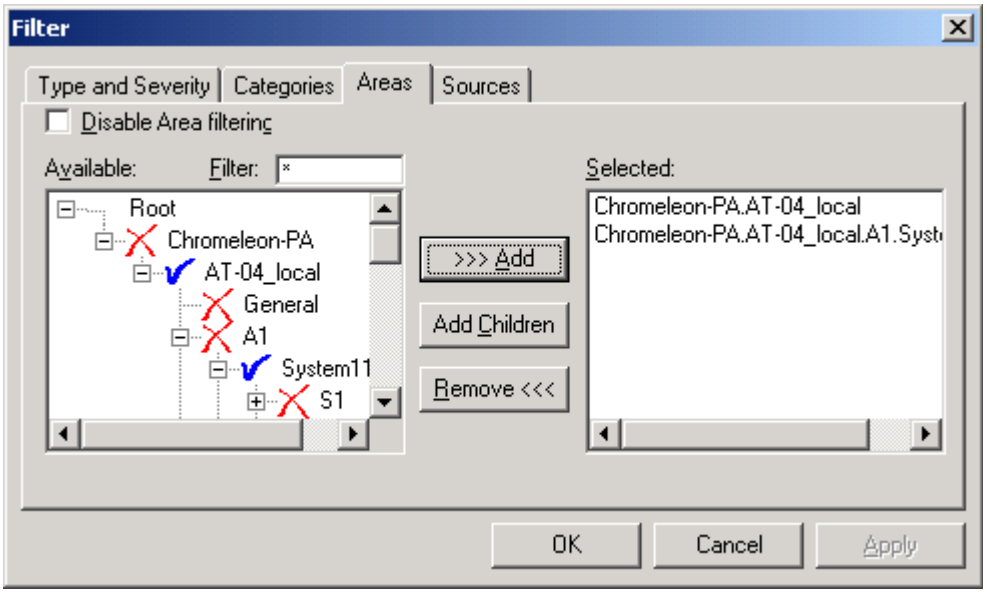


10. By default, the **Disable category filter** check box is selected. If you want all categories to be reported, accept the default and go on to Step 12.

    If you want to specify which categories are reported, clear the check box (to display the available options) and go on to Step 11.

11. Click the **Add** button to move a selected item from the **Available** window to the **Selected** window. To reverse the process, select an item in the **Selected** window and click **Remove**.

12. Select the **Areas** tab.



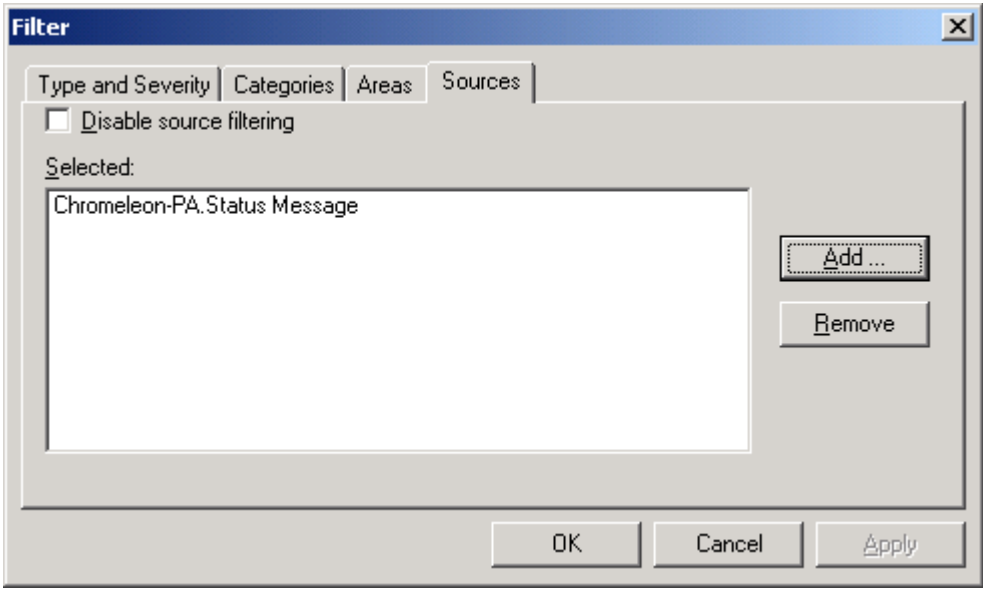
13. By default, the **Disable area filtering** check box is selected. If you want all areas to be reported, accept the default and go on to Step 15.

    If you want to specify which areas will be reported, clear the check box (to display the available options) and go on to Step 14.

14. Click the **Add** button to move a selected item from the **Available** window to the **Selected** window. Click **Add Children** to include the children of the area, also. A blue check mark precedes an item that has been selected. A red X precedes an item that has not been selected.

    To reverse the process, select an item in the **Selected** window and click **Remove**.

15. Select the **Sources** tab.

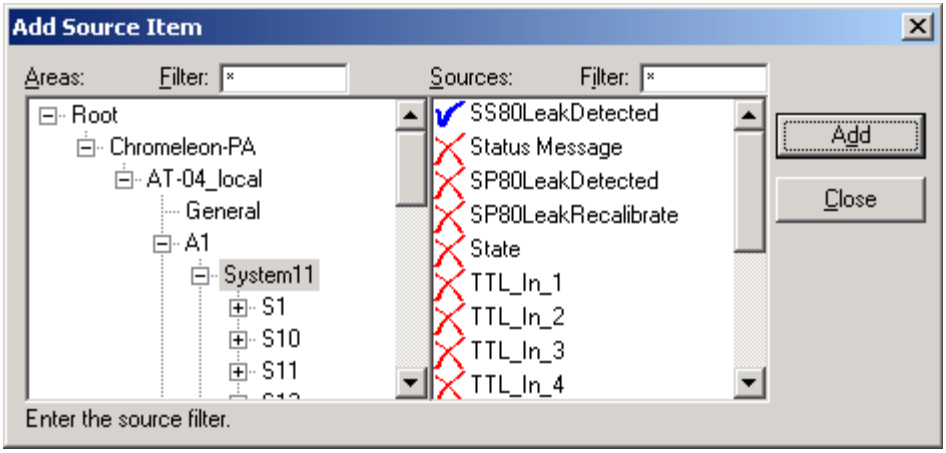


16. By default, the **Disable source filtering** check box is selected. If you want all sources to be reported, accept the default and go on to Step 18.

    If you want to specify which areas will be reported, clear the check box and go on to Step 17.

17. Click the **Add...** button to begin selecting sources.

    The **Add Source Item** dialog box appears.



18. Navigate the tree in the **Areas** window to display the required tags (sources). One at a time, select a tag and click **Add** to display the tag in the **Sources** window.

    A blue check mark precedes an item that has been selected. A red X precedes an item that has not been selected and will be filtered out.

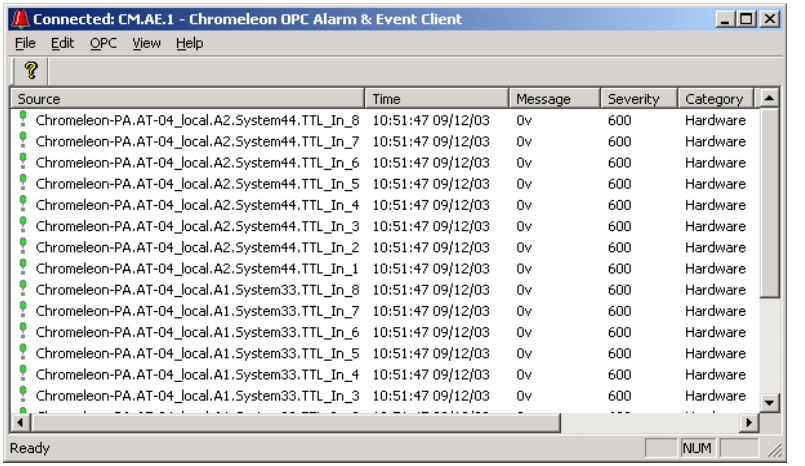
19. When you finish selecting tags, click **Close**.

20. The **Selected** windows on the **Sources** tab page now displays the tags you selected.

    To delete an item, click **Remove**.

21. When you finish making changes, click **OK**.

22. The main window of the AE client now displays the events (as they occur) that are not filtered out. The window will resemble the following example.



A.4 Gathering Post-Sample Results

The End of Sample tag (at the system level) lets you specify when to check for component and system suitability test (SST) results. SST results include validation and standard pass/fail and component alarms. The End of Sample tag provides both DA text and AE messages in the following CSV format:

First row: Fixed header column

Second row: Actual data for each column

For example:

```
“Analyzer Name”, “System Name”, “Sample Name”, “Inj. Time”,
“Event”, <CR>
“analyzer 1”, “system 1”, “sample 1”, “07-30-03 11:21:34”, <Code>
```

Where:

<CR> is a new line
<Code> is the end of sample code
1 is a sample ended normally

Any other value for <Code> indicates a premature termination of the sample and sequence. Results for the terminated sample will not be updated.

The end of a standby method is indicated by empty entries for the sample name and injection time.

The Test Results tags in the System Suitability Row (num) categories within the System Suitability group provide result text in the following CSV format:

First row: Fixed header column

Second row: Actual data for each column

For example:

```
"Sample Name","Component Name","Category Name", "Result Name",
Result", <CR>
"Standard 1","","," system suitability test Row 4"," Test Results","
Failed"
```

Where:

<CR> is a line feed

A.5 Remote Access

The OPC client can access the server remotely from another computer, provided that the computer name is specified at connection time. Follow the steps below to correctly configure DCOM.

1. Launch DCOMCNFG.EXE (in WINNT\SYSTEM32).
2. Select the following settings on the respective property pages.

Default Properties

X Enable Distributed COM on this computer

Default Authentication Level: None

Default Impersonation Level: Impersonate

Default Security

Default Access Permissions

- Add the client computer
- Type of Access: Allow Access

Default Launch Permissions

- Add the client computer
- Type of Access: Allow Launch

Default Configuration Permissions

- Add the client computer
- Type of Access: Full Control

Properties

OPCENUM & DA and AE

- General: Authentication Level; Default
- Location: Run application from this location. CLEAR OTHER OPTIONS!
- Security: Accept defaults (OPCENUM and DA only)
- Identity: The launching user (OPCENUM and DA only)

B • Example Programs

The example programs in this appendix are provided as a starting point to help you create programs for your analyzer systems and applications. Because every program is created for a specific system and application, the examples will not work "as is" with your analyzer, but the principles behind the types of commands included and the order in which they are listed can be applied to many systems.

To view the example programs in Chromeleon, go to the Chromeleon Browser and open the **Dionex Templates>IC Applications>IC CC80 Applications** folder.

NOTE **All of the examples were created for a system configured with a CC81 Component Controller, equipped with a concentrator and an EG40 eluent generator.**

The following examples are included:

Example Program	Used For
Sample Stream	Running a sample stream
Check Standard	Running a check standard
Flush	Flushing a system
Standby	Placing a system into standby
Shutdown	Shutting down a system
Calibration 1 Calibration 2 Calibration 3	Performing a multi-point calibration (only Calibration 1 is included in this appendix)

B.1 Sample Stream Example Program

This example is used for running a sample stream on a CC81 (for concentration) system. The system is equipped with a 2-mm column that uses hydroxide eluent. A concentrator and an EG40 eluent generator are also included in the system.

Sample Stream Example Program

```
;Set the pump pressure limits
;These are the default limits for the eluent generator
       Pressure.LowerLimit =     200
       Pressure.UpperLimit =     3000
       %A.Equate =               "%A"
       %B.Equate =               "%B"
       %C.Equate =               "%C"
       %D.Equate =               "%D"
;Set the detector operating conditions
       Data_Collection_Rate =    5.0
       Temperature_Compensation =1.7
       DS3_Temperature =         35
;Set the suppressor current
       SRS_Current =             50
;Set the eluent generator concentration
       Concentration =           38.00
       EluentGenerator.Curve =   5
;Set the flow rate
       Flow =                    0.30
       %B =                      0.0
       %C =                      0.0
       %D =                      0.0
       Pump.Curve =              5
;Mark the beginning of the sample prep options
       BeginSamplePrep
       Stream =                  0
       Wait                      StreamInUse
;Set the Load/Inject valve to Inject to
;flush the concentrator
       Controller_InjectValve.InjectPosition
```

Sample Stream Example Program (Continued)

```
;Set the valves to flush the sample stream to waste
;SM:0 DI:0 DV:0 SS:0 GAS:0 ME:1 CS:0
       SampleValve =            waste
       DiluentValve =           closed
       DiluentVesselValve =     purge
       SampleSTDValve =         sample
       GasValve =               vent
       MeteringValve =          DIvalve
       CheckStandardValve =     sample
;Flush for 5 minutes (required for trace analysis)
       DelaySP Duration =       5.0
;Set the valves to direct the sample stream to the
;loading pump
;SM:1 DI:0 DV:0 SS:0 GAS:0 ME:1 CS:0
       SampleValve =            SSvalve
       DiluentValve =           closed
       DiluentVesselValve =     purge
       SampleSTDValve =         sample
       GasValve =               vent
       MeteringValve =          DIvalve
       CheckStandardValve =     sample
       DelaySP Duration =       0.1
;Turn on the loading pump
       LoadPump =               On
       DilutePump =             Off
;Load 2 mL to prime the loading pump
       Load                     Volume = 2.0, Wait=True
;Set Load/Inject valve to Load
       Controller_InjectValve.LoadPosition
;Turn on the loading pump
       LoadPump =               On
       DilutePump =             Off
;Load 5 mL to the concentrator
       Load                     Volume = 5.0, Wait=True
```

Sample Stream Example Program (Continued)

```
;Mark the end of sample prep
       End                          SamplePrep
       wait                         SamplePrepComplete
;Inject the sample
0.000  Inject
       Autozero
;Turn on data acquisition
       ECD_1.AcqOn
;Set the valves to their default (non-energized) positions
;SM:0 DI:0 DV:0 SS:0 GAS:0 ME:1 CS:0
       SampleValve =                waste
       DiluentValve =               closed
       DiluentVesselValve =         purge
       SampleSTDValve =             sample
       GasValve =                   vent
       MeteringValve =              DIvalve
       CheckStandardValve =         sample
15.000 ECD_1.AcqOff
       Wait                         Ready
       End ;End of Sample Stream example program
```

B.2 Check Standard Example Program

This program is used to run a check standard on a CC81 (for concentration) system. The system is equipped with a 2-mm column that uses hydroxide eluent. A concentrator and an EG40 eluent generator are also included in the system.

Check Standard Example Program

```
;Set the pump pressure limits
;These are the default limits for the eluent generator
       Pressure.LowerLimit =     200
       Pressure.UpperLimit =     3000
       %A.Equate =               "%A"
       %B.Equate =               "%B"
       %C.Equate =               "%C"
       %D.Equate =               "%D"
;Set the detector operating conditions
       Data_Collection_Rate =    5.0
       Temperature_Compensation = 1.7
       DS3_Temperature =         35
;Set the suppressor current
       SRS_Current =             50
;Set the eluent generator concentration
       Concentration =           38.00
       EluentGenerator.Curve =   5
;Set the flow rate
       Flow =                    0.30
       %B =                      0.0
       %C =                      0.0
       %D =                      0.0
       Pump.Curve =              5
;Mark the beginning of the sample prep options
       BeginSamplePrep
       Stream =                  0
       Wait                      StreamInUse
;Set the Load/Inject valve to Inject to
;flush the concentrator
       Controller_InjectValve.InjectPosition
```

Check Standard Example Program (Continued)

```
;Set the valves to flush the check standard stream to waste
;SM:0 DI:0 DV:0 SS:0 GAS:0 ME:1 CS:1
       SampleValve =            waste
       DiluentValve =           closed
       DiluentVesselValve =     purge
       SampleSTDValve =         sample
       GasValve =               vent
       MeteringValve =          DIvalve
       CheckStandardValve =     ChkStd
;Flush for 5 minutes (required for trace analysis)
       DelaySP Duration =       5.0
;Set the valves to direct the check standard stream
;to the loading pump
;SM:1 DI:0 DV:0 SS:0 GAS:0 ME:1 CS:1
       SampleValve =            SSvalve
       DiluentValve =           closed
       DiluentVesselValve =     purge
       SampleSTDValve =         sample
       GasValve =               vent
       MeteringValve =          DIvalve
       CheckStandardValve =     ChkStd
       DelaySP Duration =       0.1
;Turn on the loading pump
       LoadPump =               On
       DilutePump =             Off
;Load 2 mL to prime the loading pump
       Load                     Volume=2.0, Wait=True
;Set the Load/Inject valve to Load
       Controller_InjectValve.LoadPosition
;Turn on the loading pump
       LoadPump =               On
       DilutePump =             Off
;Load 5 mL to the concentrator
       Load                     Volume=5.0, Wait=True
```

Check Standard Example Program (Continued)

```
;Mark the end of sample prep
       EndSamplePrep
       wait                        SamplePrepComplete
;Inject the check standard
0.000  Inject
       Autozero
;Turn on data acquisition
       ECD_1.AcqOn
;Return the valves to their default (non-energized) positions
;SM:0 DI:0 DV:0 SS:0 GAS:0 ME:1 CS:0
       SampleValve =               waste
       DiluentValve =              closed
       DiluentVesselValve =        purge
       SampleSTDValve =            sample
       GasValve =                  vent
       MeteringValve =             DIvalve
       CheckStandardValve =        sample
15.000 ECD_1.AcqOff
       Wait                        Ready
       End ;End of Check Standard example program
```

B.3 Flush Example Program

The Flush program is used when a sequence is interrupted. It clears the current sample from the system in order to run another sample (or standard).This example flushes a CC81 (for concentration) system.

Flush Example Program

```
;Set the pump pressure limits
;These are the default limits for the eluent generator
       Pressure.LowerLimit =     200
       Pressure.UpperLimit =     3000
       %A.Equate =               "%A"
       %B.Equate =               "%B"
       %C.Equate =               "%C"
       %D.Equate =               "%D"
;Set the detector operating conditions
       Data_Collection_Rate =    5.0
       Temperature_Compensation = 1.7
       DS3_Temperature =         35
;Set the suppressor current
       SRS_Current =             50
;Set the eluent generator concentration
       Concentration =           38.00
       EluentGenerator.Curve =   5
;Set the pump flow
       Flow =                    0.30
       %B =                      0.0
       %C =                      0.0
       %D =                      0.0
       Pump.Curve =              5
       BeginSamplePrep
       Stream =                  0
       Wait                      StreamInUse
;Set the Load/Inject valve to Inject to
;flush the concentrator
       Controller_InjectValve.InjectPosition
```

Flush Example Program (Continued)

```
;Set the valves to flush the dilution vessel
;SM:0 DI:0 DV:0 SS:0 GAS:1 ME:1 CS:0
       SampleValve =            waste
       DiluentValve =           closed
       DiluentVesselValve =     purge
       SampleSTDValve =         sample
       GasValve =               pressurize
       MeteringValve =          DIvalve
       CheckStandardValve =     sample
;Flush the dilution vessel for 2 minutes
       DelaySP Duration =       2.0
;Set the valves to their default (non-energized) positions
;SM:0 DI:0 DV:0 SS:0 GAS:0 ME:1 CS:0
       SampleValve =            waste
       DiluentValve =           closed
       DiluentVesselValve =     purge
       SampleSTDValve =         sample
       GasValve =               vent
       MeteringValve =          DIvalve
       CheckStandardValve =     sample
       EndSamplePrep
       wait                     SamplePrepComplete
0.000  Inject
;Continue flush for 2 minutes
2.000
       WaitReady
       End ;End of Flush example program
```

B.4 Standby Example Program

This program is used to place a CC81 (for concentration) system in standby.

Standby Example Program

```
;Set the pump pressure limits
;These are the default limits for the eluent generator
       Pressure.LowerLimit =     200
       Pressure.UpperLimit =     3000
       %A.Equate =               "%A"
       %B.Equate =               "%B"
       %C.Equate =               "%C"
       %D.Equate =               "%D"
;Set the detector operating conditions
       Data_Collection_Rate =    5.0
       Temperature_Compensation = 1.7
       DS3_Temperature =         35
;Set the suppressor current
       SRS_Current =             50
;Set the eluent generator concentration to a low
;concentration to allow faster equilibration when resuming
       Concentration =           0.38
       EluentGenerator.Curve =   5
;Set the pump flow
       Flow =                    0.30
       %B =                      0.0
       %C =                      0.0
       %D =                      0.0
       Pump.Curve =              5
       BeginSamplePrep
       Stream =                  0
       Wait                      StreamInUse
;Set the Load/Inject valve to Inject to
;flush the concentrator
       Controller_InjectValve.InjectPosition
```

Standby Example Program (Continued)

```
;Set the valves to their default (non-energized) positions
;SM:0 DI:0 DV:0 SS:0 GAS:0 ME:1 CS:0
       SampleValve =            waste
       DiluentValve =           closed
       DiluentVesselValve =     purge
       SampleSTDValve =         sample
       GasValve =               vent
       MeteringValve =          DIvalve
       CheckStandardValve =     sample
       EndSamplePrep
       wait                     SamplePrepComplete
0.000  Inject
1.000
       WaitReady
       End ;End of Standby example program
```

B.5 Shutdown Example Program

This program is used to shut down a CC81 (for concentration) system.

Shutdown Program Example

```
;Set the pump pressure limits
;These are the default limits for the eluent generator
       Pressure.LowerLimit =     200
       Pressure.UpperLimit =     3000
       %A.Equate =               "%A"
       %B.Equate =               "%B"
       %C.Equate =               "%C"
       %D.Equate =               "%D"
;Set the detector operating conditions
       Data_Collection_Rate =    5.0
       Temperature_Compensation = 1.7
       DS3_Temperature =         35
;Turn off the suppressor
       SRS_Current =             Off
;Turn off the eluent generator
       Concentration =           0.00
       EluentGenerator.Curve =   5
;Turn off the pump flow
       Off
       %B =                      0.0
       %C =                      0.0
       %D =                      0.0
       Pump.Curve =              5
       BeginSamplePrep
       Stream =                  0
       Wait                      StreamInUse
       Controller_InjectValve.InjectPosition
```

Shutdown Program Example (Continued)

```
;Set the valves to their default (non-energized) positions
;SM:0 DI:0 DV:0 SS:0 GAS:0 ME:1 CS:0
       SampleValve =            waste
       DiluentValve =           closed
       DiluentVesselValve =     purge
       SampleSTDValve =         sample
       GasValve =               vent
       MeteringValve =          DIvalve
       CheckStandardValve =     sample
       EndSamplePrep
       wait                     SamplePrepComplete
0.000  Inject
1.000
       WaitReady
       End ;End of Shutdown example program
```

B.6 Calibration Example Programs

The three calibration example programs are used to perform a multi-point calibration on a CC81 (for concentration) system. The system is equipped with a 2-mm column that uses hydroxide eluent. A concentrator and an EG40 eluent generator are also included in the system.

The Calibration 1 example (listed below) dilutes 1 metering valve (ME) loop of stock standard in 100 mL of diluent. The remaining two calibration example programs (not listed in this appendix), dilute 5 standard loops and 10 standard loops, respectively, in a total of 100 mL of diluent. For the Calibration 2 example, this is accomplished by diluting 1 standard loop in 20 mL and repeating the process a total of 5 times. For the Calibration 3 example, the 1 to 20 dilution is repeated 10 times.

Calibration 1 Program Example

```
;Set the pump pressure limits
;These are the default limits for the eluent generator
       Pressure.LowerLimit =     200
       Pressure.UpperLimit =     3000
       %A.Equate =               "%A"
       %B.Equate =               "%B"
       %C.Equate =               "%C"
       %D.Equate =               "%D"
;Set the detector operating conditions
       Data_Collection_Rate =    5.0
       Temperature_Compensation =1.7
       DS3_Temperature =         35
;Set the suppressor current
       SRS_Current =             50
;Set the eluent generator concentration
       Concentration =           38.00
       EluentGenerator.Curve =   5
;Set the flow rate
       Flow =                    0.30
       %B =                      0.0
       %C =                      0.0
       %D =                      0.0
       Pump.Curve =              5
```

Calibration 1 Program Example (Continued)

```
;Mark the beginning of the sample prep options
       BeginSamplePrep
       Stream =                  0
       Wait                      StreamInUse
       Controller_InjectValve.InjectPosition
;Set the valves to fill the ME valve standard loop
;SM:0 DI:1 DV:0 SS:0 GAS:0 ME:0 CS:0
       SampleValve =             waste
       DiluentValve =            open
       DiluentVesselValve =      purge
       SampleSTDValve =          sample
       GasValve =                vent
       MeteringValve =           STvalve
       CheckStandardValve =      sample
       DelaySP Duration =        0.1
;Turn on the dilution pump
       LoadPump =                Off
       DilutePump =              On
;Prime the dilution pump
       Dilute                    Volume=2.0, Wait=True
;Set the valves to fill the dilution vessel
;SM:0 DI:1 DV:1 SS:0 GAS:0 ME:1 CS:0
       SampleValve =             waste
       DiluentValve =            open
       DiluentVesselValve =      SSvalve
       SampleSTDValve =          sample
       GasValve =                vent
       MeteringValve =           DIvalve
       CheckStandardValve =      sample
       DelaySP Duration =        0.1
;Turn on the dilution pump
       LoadPump =                Off
       DilutePump =              On
;Deliver 100 mL to the dilution vessel
       Dilute                    Volume=100.0, Wait=True
```

Calibration 1 Program Example (Continued)

```
;Set the valves to pressurize the dilution vessel and purge
;the line between the dilution vessel and the DV valve
;SM:0 DI:0 DV:0 SS:0 GAS:1 ME:1 CS:0
       SampleValve =             waste
       DiluentValve =            closed
       DiluentVesselValve =      purge
       SampleSTDValve =          sample
       GasValve =                pressurize
       MeteringValve =           DVvalve
       CheckStandardValve =      sample
       DelaySP Duration =        0.1
;Set the valves to load the dilution vessel contents
;SM:0 DI:0 DV:1 SS:1 GAS:1 ME:1 CS:0
       SampleValve =             waste
       DiluentValve =            closed
       DiluentVesselValve =      SSvalve
       SampleSTDValve =          standard
       GasValve =                pressurize
       MeteringValve =           DIvalve
       CheckStandardValve =      sample
       DelaySP Duration =        0.1
;Turn on the loading pump
       LoadPump =                On
       DilutePump =              Off
;Load 2 mL to prime the loading pump
       Load                      Volume=2.0, Wait=True
;Set Load/Inject valve to Load
       Controller_InjectValve.LoadPosition
       DelaySP Duration =        0.1
       LoadPump =                On
       DilutePump =              Off
;Load 5 mL to the concentrator
       Load                      Volume=5.0, Wait=True
```

Calibration 1 Program Example (Continued)

```
        EndSamplePrep
        wait                        SamplePrepComplete
;Inject the diluted stock standard
 0.000  Inject
        Autozero
;Turn on data acquisition
        ECD_1.AcqOn
;Set the valves to purge the dilution vessel
;SM:0 DI:0 DV:1 SS:0 GAS:1 ME:1 CS:0
        SampleValve =               waste
        DiluentValve =              closed
        DiluentVesselValve =        purge
        SampleSTDValve =            sample
        GasValve =                  pressurize
        MeteringValve =             DIvalve
        CheckStandardValve =        sample
;Set the valves to their default (non-energized) positions
;SM:0 DI:0 DV:1 SS:0 GAS:0 ME:1 CS:0
2.000
        SampleValve =               waste
        DiluentValve =              closed
        DiluentVesselValve =        purge
        SampleSTDValve =            sample
        GasValve =                  vent
        MeteringValve =             DIvalve
        CheckStandardValve =        sample
;Turn off data acquisition
15.000  ECD_1.AcqOff

        Wait                        Ready
        End ;End of Calibration 1 example program
```