
6.0 DataWorx PLC

6.1 Server

Overview

The DataWorx PLC Server's primary functions entail listening for PLC data and recording the data into text files in the user-specified format.

The format of the text file is specified using the DataWorx PLC Monitor. For more information on configuring the Server with the Monitor, refer to section 6.2.

6.1.1 Installing Service

The DataWorx PLC Server must first be installed and running in order for it to operate without user intervention. Installing the Server is a simple process:

Go to the **START** button, then select:

**PROGRAMS -> AUTOMATIONDIRECT ->
DATAWORX PLC -> DATAWORX PLC SERVER**



DataWorx PLC

The DataWorx PLC Server window will open. If the Server has not yet been installed, the Server Status will display as “Not Installed.”

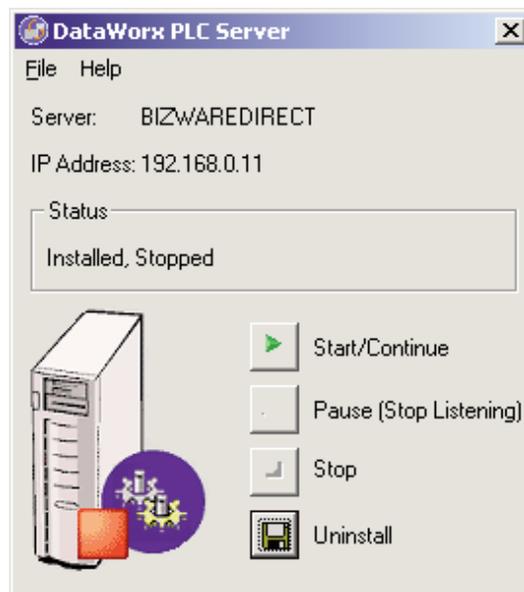


Click **INSTALL**. The DataWorx PLC Server window will update and display the Server Status as “Installed, Stopped.”

The “Start/Continue” button will be enabled and the former “Install” button will now display as “Uninstall.”



Note: This does not start the DataWorx PLC Server. To start the Server refer to “Running Service,” in section 6.1.2.



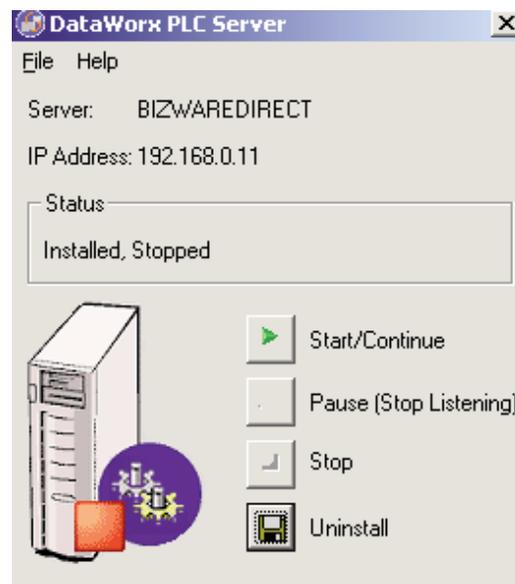
6.1.2 Running Service

If the DataWorx PLC Server Window is not open, go to the START button, then select:

**PROGRAMS -> AUTOMATIONDIRECT ->
DATAWORX PLC -> DATAWORX PLC SERVER**



The DataWorx PLC Server window will open. If the Server has already been installed, the Server Status will display as “Installed; Stopped.”



Click **START/CONTINUE** to start the Service. The status will update to “Installed, Running.”



Note: If the DataWorx PLC Server has not yet been installed, refer to “Installing Service,” in section 6.1.1.

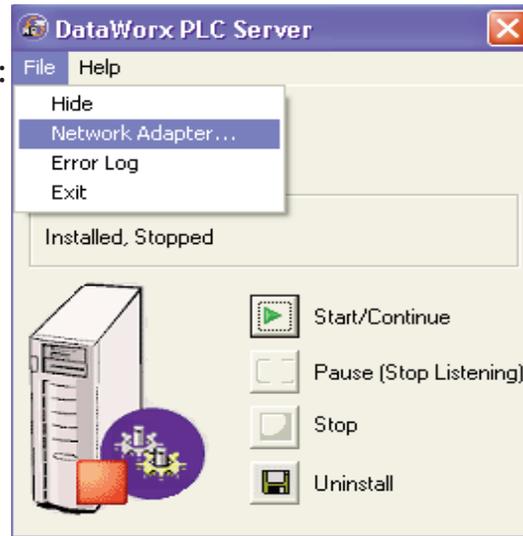
6.1.3 Multiple Network Adapters

If there is more than one network adapter available on the server PC, it will be necessary to ensure that the appropriate network adapter is being used by DataWorx PLC Server..

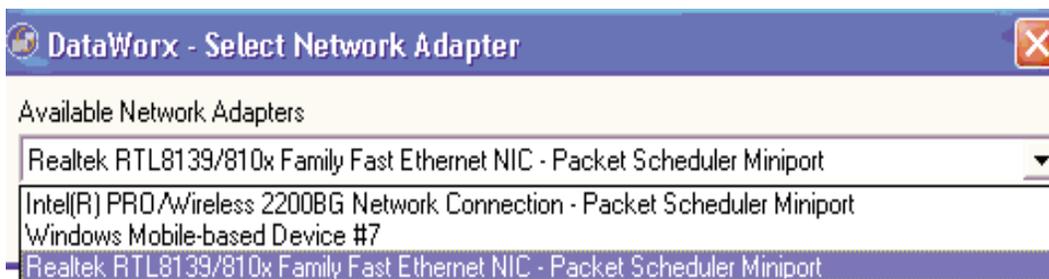
From the toolbar, select:

FILE ->

**NETWORK
ADAPTER**



The Select Network Adapter window will open.



Click in the Available Network Adapters field to view the list of network adapters available for the server PC. Select the appropriate network adapter from the list.



Click OK.

6.1.4 Pausing

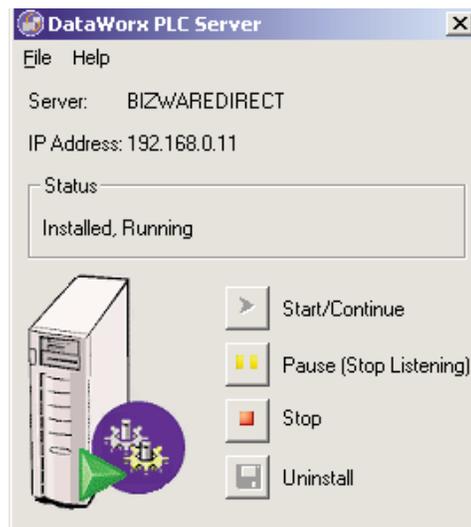
Pausing forces the Server to stop listening for PLC input. This can be useful when configuring the Server because it will prevent unwanted data from being stored.

If the DataWorx PLC Server Window is not open, go to the **START** button, then select:

**PROGRAMS -> AUTOMATIONDIRECT ->
DATAWORX PLC -> DATAWORX PLC SERVER**



The DataWorx PLC Server window will open. If the Server is already installed and running, the Server Status will display as “Installed; Running.”



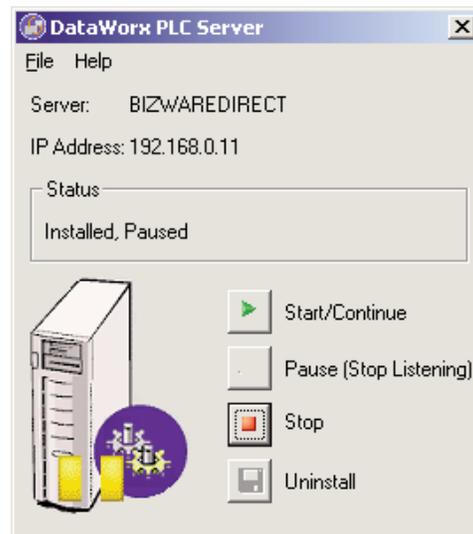
Note: If the DataWorx PLC Server has not yet been installed, refer to “Installing Service,” in section 6.1.1.

DataWorx PLC

Click PAUSE (STOP LISTENING). The Status will update to “Installed, Paused.”



Note: Pausing does not stop the DataWorx PLC Server. To stop the Server refer to “Stopping Service,” in section 6.1.5.



6.1.5 Stopping Service

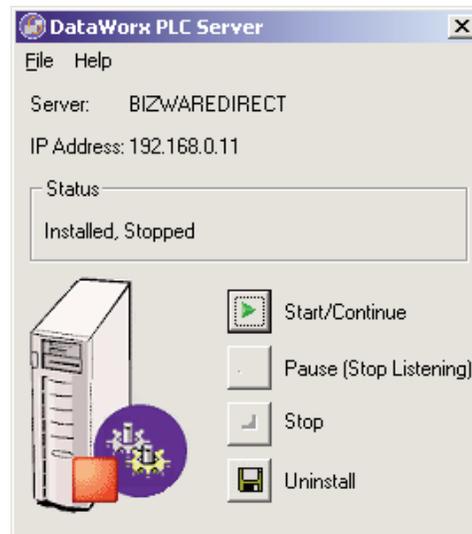
Stopping the DataWorx Server completely stops the program, instead of merely stopping its listening state. This feature is useful because the Server must be stopped before it can be uninstalled.

If the DataWorx Server window is not open, go to the **START** button, then select:

**PROGRAMS -> AUTOMATIONDIRECT ->
DATAWORX PLC -> DATAWORX PLC SERVER**



In the DataWorx PLC Server Window, click **STOP**. The Status will update to “Installed, Stopped.” Only the buttons labeled “Start/Continue” and “Uninstall” will be enabled.



6.1.6 Viewing the Error Log

The DataWorx PLC Server maintains an error log to use as a diagnostic tool for troubleshooting.

If the DataWorx PLC Server window is not open, go to the **START** Button, then select:

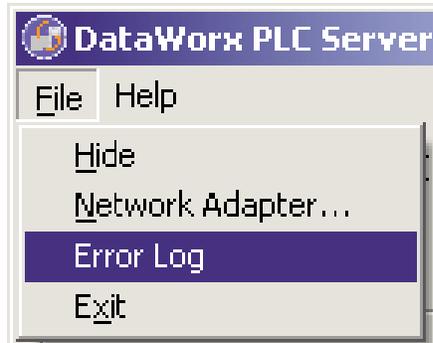
PROGRAMS -> AUTOMATIONDIRECT -> DATAWORX PLC -> DATAWORX PLC SERVER



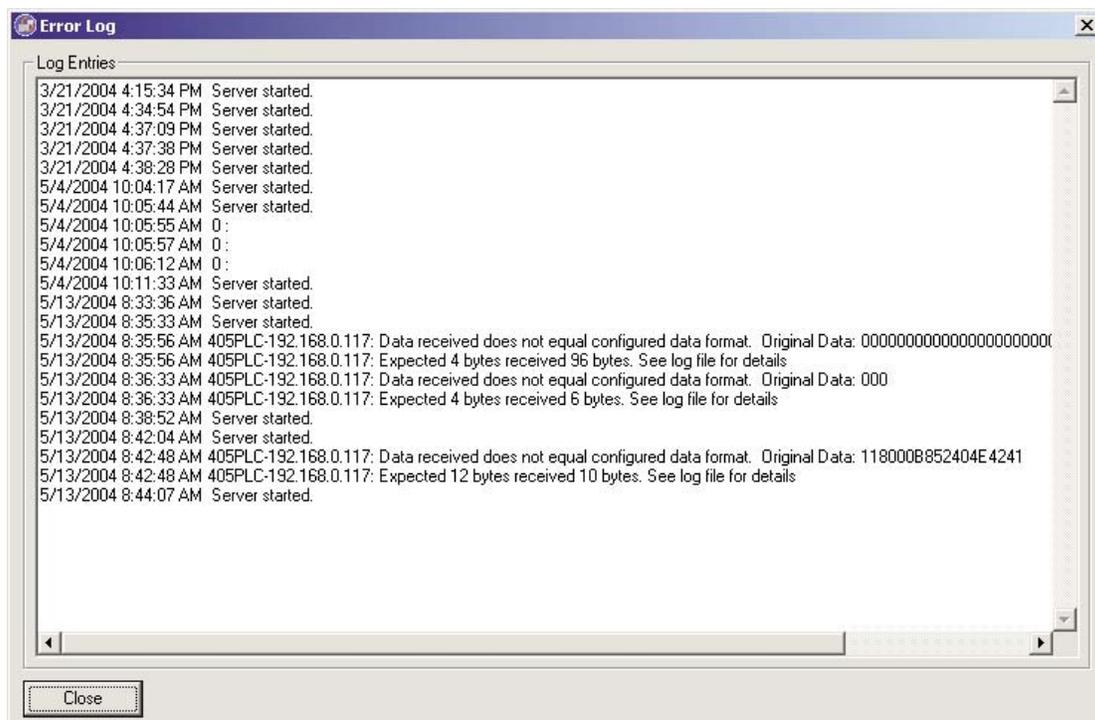
DataWorx PLC

In the DataWorx PLC Server window, go to menu:

FILE -> ERROR LOG



The Error Log window will open.

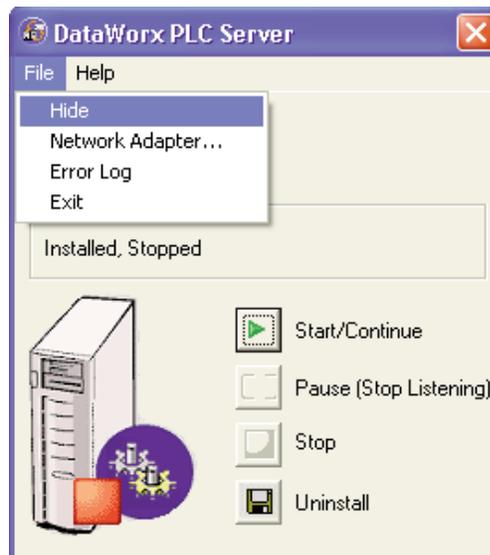


The Error Log window contains any error messages that were generated by the Server and Monitor programs. It serves as a useful troubleshooting tool.

6.1.7 Hiding

Hiding is a convenient feature for temporarily placing the Server window out of view on the desktop for later access. From the menu, select:

FILE -> HIDE



The DataWorx PLC icon will appear on the task bar.



The user can restore the application by right clicking on the DataWorx PLC icon and selecting "Restore."

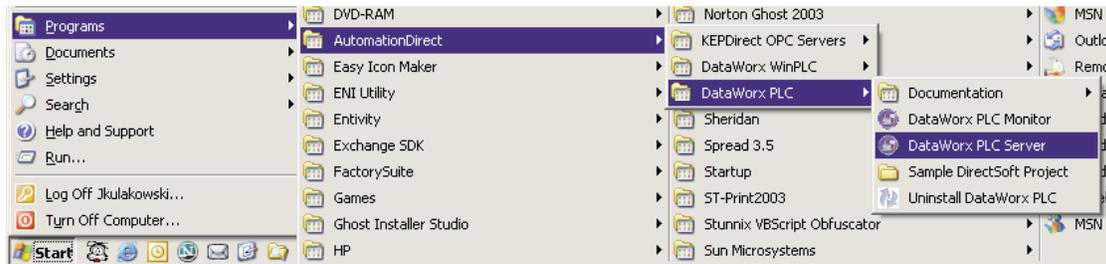


6.1.8 Uninstalling Service

Occasionally, for troubleshooting purposes it may be necessary to uninstall the DataWorx PLC Server entirely.

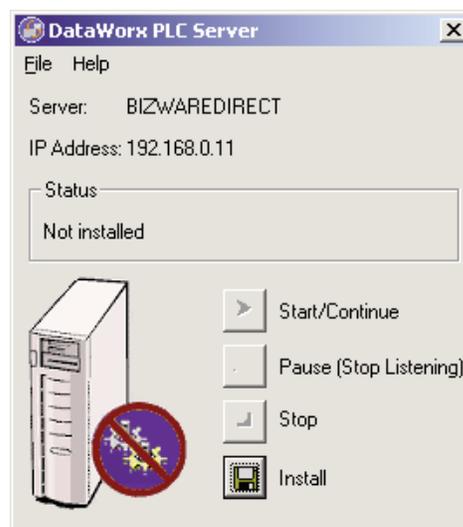
If the DataWorx PLC Server window is not open, go to the **START** button, then select:

**PROGRAMS -> AUTOMATIONDIRECT ->
DATAWORX PLC -> DATAWORX PLC SERVER**



Note: The Server must already be stopped. Refer to “Stopping Service,” in section 6.1.5.

From the DataWorx PLC Server window, click **UNINSTALL**. The Server Status will update to “Not Installed.”



6.2 Monitor

Overview

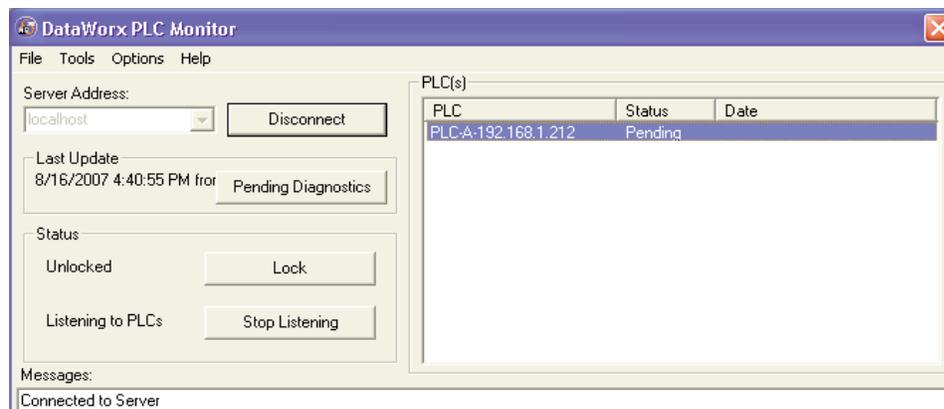
The DataWorx PLC Monitor's primary functions entail configuring the DataWorx PLC Server, retrieving its data files over the network and enabling troubleshooting for individual PLCs.

To open the DataWorx PLC Monitor window, go to the **START** button, then select:

**PROGRAMS -> AUTOMATIONDIRECT ->
DATAWORX PLC -> DATAWORX PLC MONITOR**

The DataWorx PLC Monitor window will open. If no PLCs have been configured, then the PLC(s) list will be empty.

In the example below, the Monitor is connected to the DataWorx Server and one PLC has already been configured for the Server.



DataWorx PLC

Below is an explanation of each field in the DataWorx PLC Monitor window.

Server Address: Denotes the address of the DataWorx PLC Server PC.

Last Update: Displays the time of the most recent PLC communication.

Pending Diagnostics: If the Server cannot establish communication with a PLC, then a button labeled “Pending Diagnostics” will appear in the Last Update section and the status in the PLC section will display as Pending. This button is used for troubleshooting. For further details, please refer to Troubleshooting, Chapter 7 of this manual.

Status: Displays the DataWorx PLC Server’s locked and listening states.

PLC(s): Lists the currently configured PLCs for the selected DataWorx Server along with the respective status.



Note: PLC(s) lists the last update; check the date to verify that information is being received as expected.

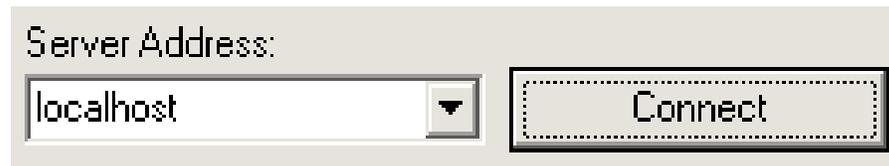
Messages: Displays updates from both the Server as well as from the Monitor itself.

6.2.1 Connecting to the Server

Connecting to the DataWorx PLC Server is necessary in order to configure the Server and retrieve its data files.

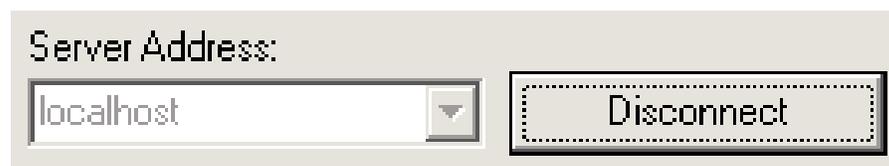
In the main Monitor window, the Server Address field will automatically default to the localhost option.

If the DataWorx PLC Server is installed on the same PC as the DataWorx PLC Monitor program, then the localhost option is appropriate. Otherwise, enter the IP Address of the DataWorx Server PC into the Server Address field or select it from the available list.



Click **CONNECT** to connect to the DataWorx PLC Server.

If the connection is successful, the "Connect" button label will update to "Disconnect" and the Messages field will display "Connected to Server."



6.2.2 Configuring the Server



Note: Before configuring the Server, the user must connect to it from the main Monitor window.

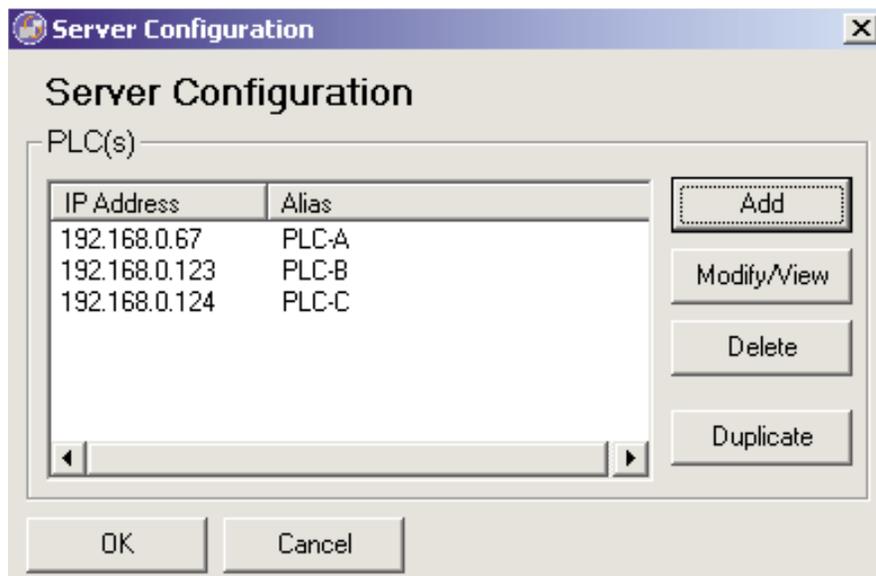
Go to menu:

OPTIONS -> CONFIGURE SERVER



The Server Configuration window will open. If no PLCs have been configured, then the PLC list will be empty.

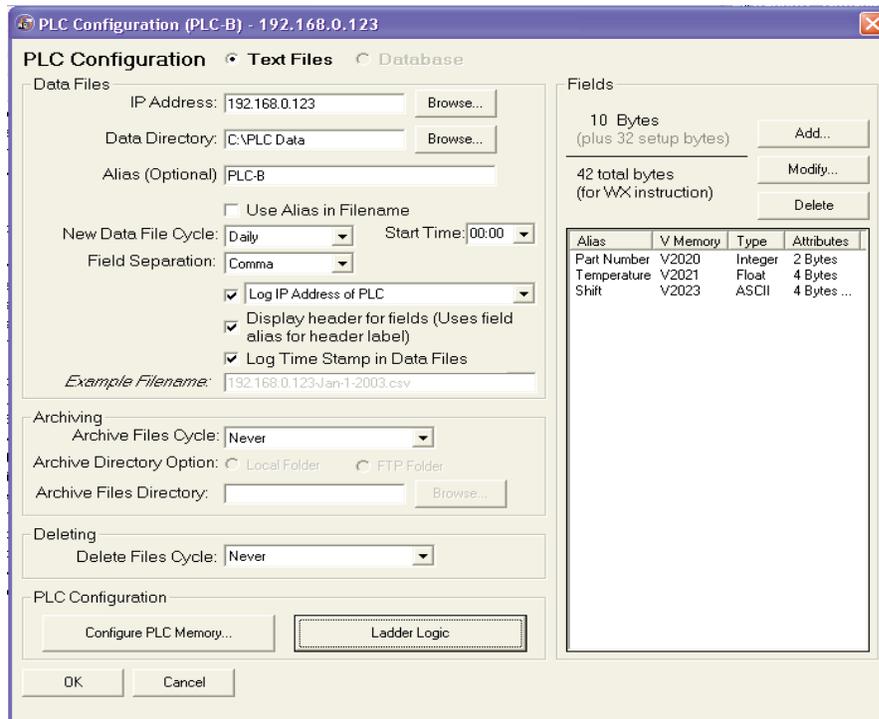
In the example below, three PLCs have already been configured for the Server.



To add a PLC, click **ADD**.

A PLC Configuration window similar to the following will open, with the “Text Files” option selected by default.

The example below reflects information that has already been filled in by the user.



Below is an explanation of each field in the PLC Configuration window.

IP Address: Denotes the IP Address of the PLC

Data Directory: Designates the folder on the Server where all the input from the PLC will be stored

Alias: Optional name for the PLC - can be useful compared to remembering cryptic IP Addresses

Use Alias in Filename: If set, the Server will use the Alias instead of the IP Address field in naming the PLC data files

New Data File Cycle: Specifies how often the Server will create a new file for the PLC data, and has the following options: Daily, 2 Shifts, 3 Shifts, Monthly, Yearly and Never (one file). The user may specify that all logged data be kept in a single file by selecting "Never (one file)."

Start Time or Shift 2 Starts:

- When the New Data File Cycle is set to "Daily," then the field is labeled "Start Time." The time entered into the Start Time field indicates at what time on a daily basis a new data log file will be created.
- When the New Data File Cycle is set to "2 Shifts" or "3 Shifts," then the field label is "Shift 2 Starts." Specifies the start time of the 2nd shift and is used to calculate the start times of any other shifts, with each shift lasting 12 hours for the "2 Shifts" option and 8 hours for the "3 Shifts" option. For more details on this field refer to the Shift Information chart on Page 45.

Field Separation: The data segments received from the PLC need to be separated from each other inside of the text file. Currently, a comma or a tab may be used to separate the segments.

Log IP Address of PLC: When the check box is set and this option is selected from the drop-down list, the Server will record the IP Address of the PLC along with the data received from the PLC to the text file.

Log Alias of PLC: When the check box is set and this option is selected from the drop-down list, the Server will record the Alias of the PLC along with the data received from the PLC to the text file.

Display header for fields: When set, it indicates that the Server will record the header information labeling each column along with the PLC data to the text file.

Log Time Stamp in Data Files: When set, it indicates that the Server will record the time stamp to the text file.

Example Filename: Based on the combination of the following fields, it displays an example name for the data log file in which the PLC data is being stored: New Data File Cycle, Use Alias in Filename, Field Separation, IP Address, and Alias.

Archive Files Cycle: Specifies how often ZIP file archives of the data log files will be created, and has the following options: Daily, Monthly, Yearly or Never.

Archive Directory Option: Indicates whether the location of the ZIP file archives is a Local Directory on the DataWorx Server C: drive or an FTP location.

Archive Files Directory or FTP Location:

This field is labeled “Archive Files Directory” when the Archive Directory Option “Local Folder” is set. The BROWSE button allows the user to select a folder on the Server.

This field is labeled “FTP Location” when the Archive Directory Option “FTP Folder” is set. The SETTINGS button allows the user to specify the FTP connection settings: Server URL, User Name and Password.

Delete Files Cycle: Enables the deletion of the data files every day, month or year.

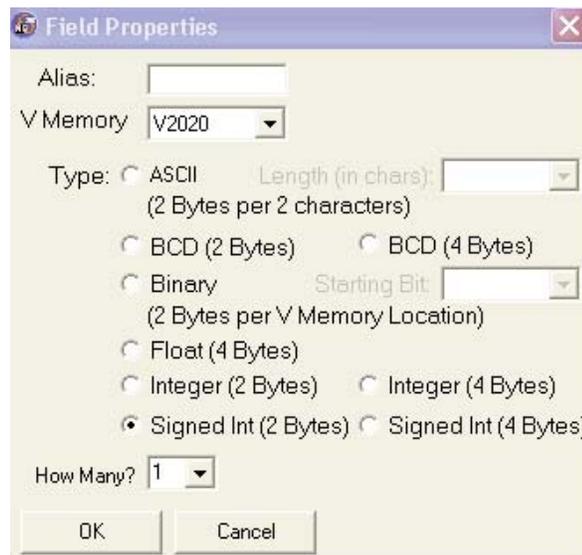
Configure PLC Memory: Allows the user to automatically configure the PLC to send data to the Server.

Ladder Logic: Provides a dynamic example of the ladder logic required to send data to DataWorx.

DataWorx PLC

Fields: Lists configured data fields and respective VMemory locations for data that the PLC is sending. The example above reflects fields that have already been filled in by the user. Use the Add, Modify, and Delete buttons to define the data fields.

- To create a new field, click **ADD**. The Field Properties window will open.



The screenshot shows the 'Field Properties' dialog box. It has a title bar with a close button. The fields are: 'Alias' (text input), 'V Memory' (dropdown menu showing 'V2020'), 'Type' (radio buttons for ASCII, BCD (2 Bytes), BCD (4 Bytes), Binary, Float (4 Bytes), Integer (2 Bytes), Integer (4 Bytes), Signed Int (2 Bytes), and Signed Int (4 Bytes)), 'Length (in chars)' (dropdown menu), and 'Starting Bit' (dropdown menu). At the bottom, there is a 'How Many?' dropdown menu set to '1', and 'OK' and 'Cancel' buttons.

- **Alias:** This optional field is useful for describing the type of information being sent by the PLC.
- **VMemory:** The user must choose a VMemory location in order for DataWorx to expect the appropriate information.
- **Type:** Allows the user to specify the data type of the information coming from the PLC.
- **How Many?:** Allows the user to create more than one consecutive field of the same data type.
- To create the specified field, click **OK**. Otherwise, to discard the new field, click **CANCEL**.

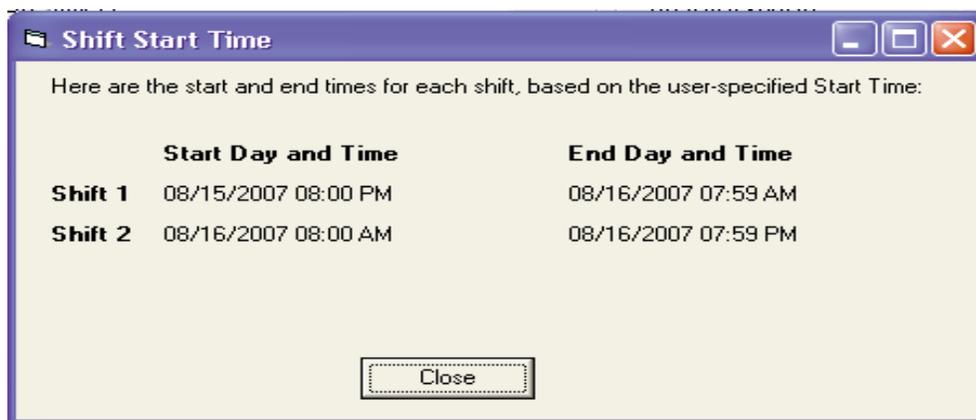
- To edit an existing field, select the field and click **MODIFY**. The Field Properties window will open, displaying the field’s settings. Once the edits have been made, either click **OK** to save the changes, or click **CANCEL** to discard the changes.
- To delete an existing field, select the field and click **DELETE**. The field will no longer appear in the Fields list.

Shift Information

The Shift Information table below provides five examples to illustrate how each combination of the “New Data File Cycle” field and the “Start Time” or “Shift 2 Starts” field determines each shift’s start and end time.

Example Number	New Data File Cycle	Start Time (Today)	Shift 2 Starts (Today)	Shift # and Duration (hours)	Shift Start Time and Day	Shift End Time and Day
(1)	Daily	Midnight	n/a	1 (24 hours)	Midnight Today	11:59 PM Today
(2)	Daily	Noon	n/a	1 (24 hours)	Noon Today	11:59 AM Tomorrow
(3)	2 Shifts	n/a	8:00 AM	1 (12 hours)	8:00 PM Yesterday	7:59 AM Today
				2 (12 hours)	8:00 AM Today	7:59 PM Today
(4)	3 Shifts	n/a	8:00 AM	1 (8 hours)	Midnight Today	7:59 AM Today
				2 (8 hours)	8:00 AM Today	3:59 PM Today
				3 (8 hours)	4:00 PM Today	11:59 PM Today
(5)	3 Shifts	n/a	6:00 AM	1 (8 hours)	10:00 PM Yesterday	5:59 AM Today
				2 (8 hours)	6:00 AM Today	1:59 PM Today
				3 (8 hours)	2:00 PM Today	9:59 PM Today

In the PLC Configuration window, when the “Start Time” or “Shift 2 Starts” field is edited, the Shift Start Time window will open displaying the resulting shift information, with one line per shift. The example below reflects the current day of August 16th, and the user has set the New Data File Cycle to 2 Shifts with a Shift 2 Starts time of 8:00AM.



Click **CLOSE** to close the Shift Start Time window.

6.2.3 PLC Configuration Help

Ladder Logic

To assist with PLC memory configuration and V memory data setup, a Ladder Logic window is available.

From the PLC Configuration window, click **LADDER LOGIC**.



The Ladder Logic window will open (see next page).

On the next page is an example of the Ladder Logic window with WX and RX PLC Ladder Logic Networking instructions that are required for DataWorx to respond to the connected PLC.

This example represents the exact number of bytes needed to send/receive and the stored V memory chosen in the previous dialog of this configuration procedure.

The next page may be used as a guide for entering the PLC ladder logic.

DataWorx PLC

Ladder Logic

Below is an illustration on what the rungs in the DirectSoft program should be to implement the WX/RX commands in the PLC. For future reference you can print this sheet by pressing the Print button.

WX

Cx SPxxx (Busy)

Contact to trigger the WX command SPxxx forces this rung to execute only when the ECOM is NOT busy

SPxxx Codes

Kx90 where x is slot number and 90 is address

Slot Numbering

bytes to send

V Memory location where configuration is stored

Actual WX Command

LD Kx90

LD K42

LDA 02000

WX TA0

RX

Cx SPxxx (Busy)

Contact to trigger the RX command SPxxx forces this rung to execute only when the ECOM is NOT busy

SPxxx Codes

Kx90 where x is slot number and 90 is address

Slot Numbering

bytes to receive

V Memory location where configuration is stored

Actual RX Command

LD Kx90

LD K32

LDA 03000

RX TA0

Don't show this again

PLC Memory

From the PLC Configuration window, click **CONFIGURE PLC MEMORY**.

The Configure PLC Memory window will open. Below is the configure PLC Memory window where the starting addresses for WX and RX instructions will be referenced.

By using the **AUTO CONFIGURE** button, all values shown in the window will be written to the registers shown.

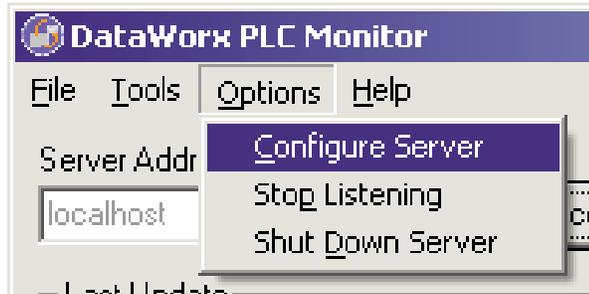


**** IMPORTANT **** Be sure that this memory range is set for “Retentive” in the PLC. Otherwise, these values will be reset during any power cycle.

6.2.4 Modifying a PLC

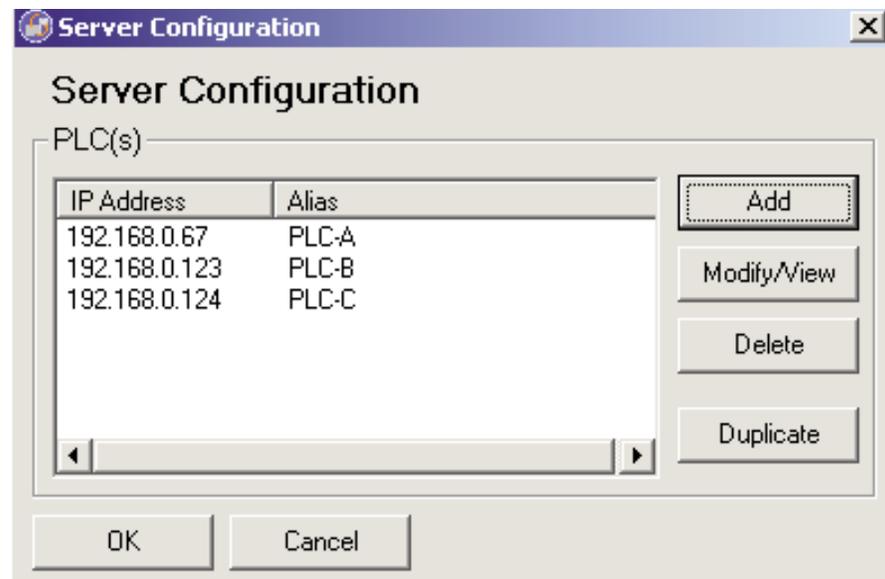
Go to menu:

OPTIONS -> CONFIGURE SERVER



The Server Configuration window will open. If no PLCs have been configured, then the PLCs list will be empty.

In the example below, three PLCs have already been configured for the Server.

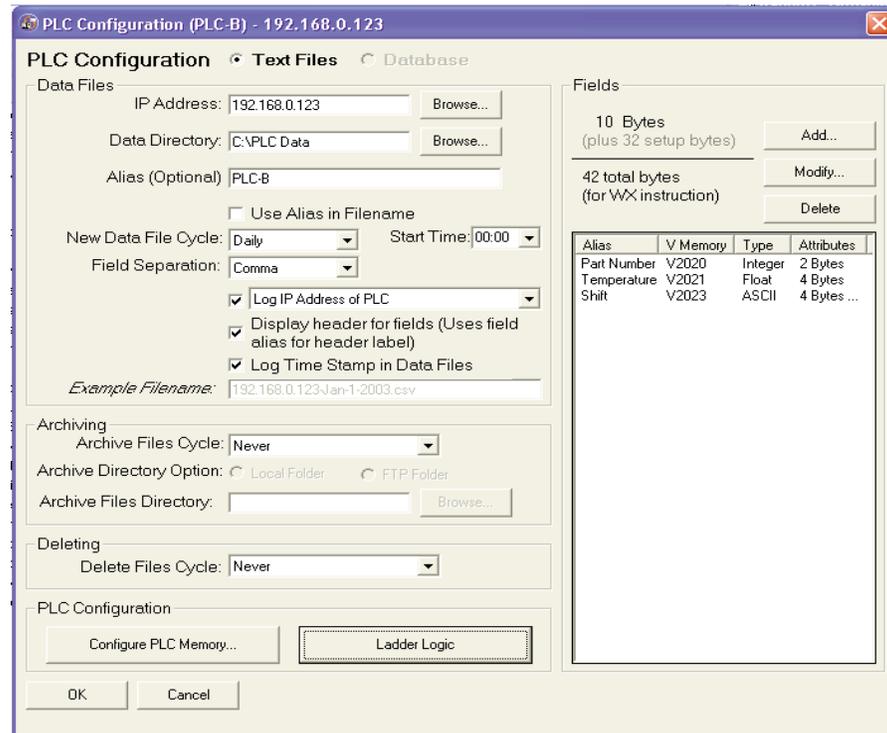


Select the PLC to modify or to view.

Click **MODIFY/VIEW**.

The PLC Configuration window will open and display the settings for the selected PLC.

Below is an example of the PLC Configuration window.



Note that the PLC Configuration window title bar displays both the PLC IP Address as well as the PLC Alias, if one exists.



Note: From the main Monitor window, right click on the PLC and select Configure from the menu.

Once changes have been made, click **OK** to save changes or click **CANCEL** to discard changes.

Once a PLC has been updated, the main Monitor window will show a status of “Pending” for the PLC while the connection between the Server and the PLC is being refreshed.

6.2.5 Deleting

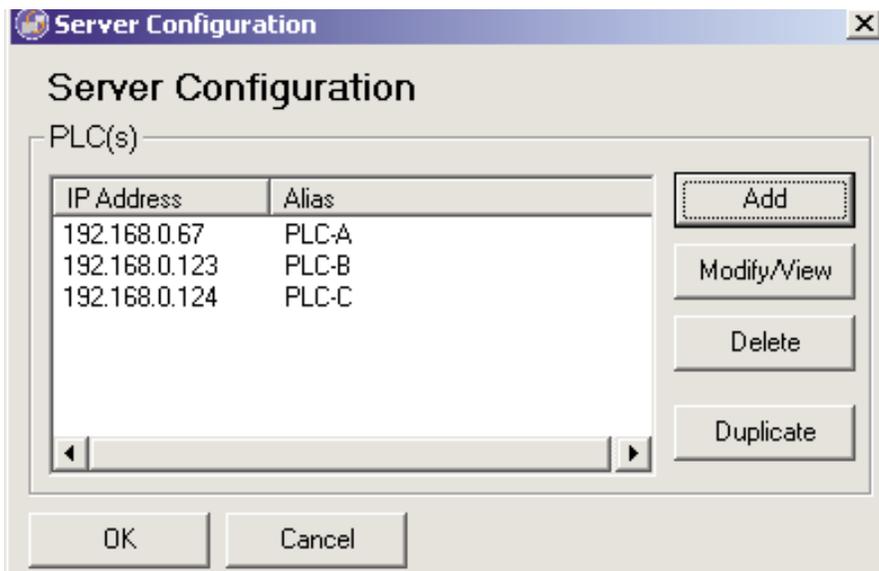
To delete a PLC, go to menu:

OPTIONS -> CONFIGURE SERVER



The Server Configuration window will open. If no PLCs have been configured, then the PLC list will be empty.

In the example below, three PLCs have already been configured for the Server.



Select the PLC to be deleted, and click **DELETE**. The PLC will disappear from the PLC list.

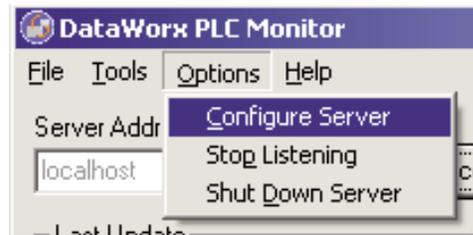
Click **OK** to close the Server Configuration window.

6.2.6 Duplicating

Duplicating is a great time-saving feature for users who are managing many PLCs with similar configurations.

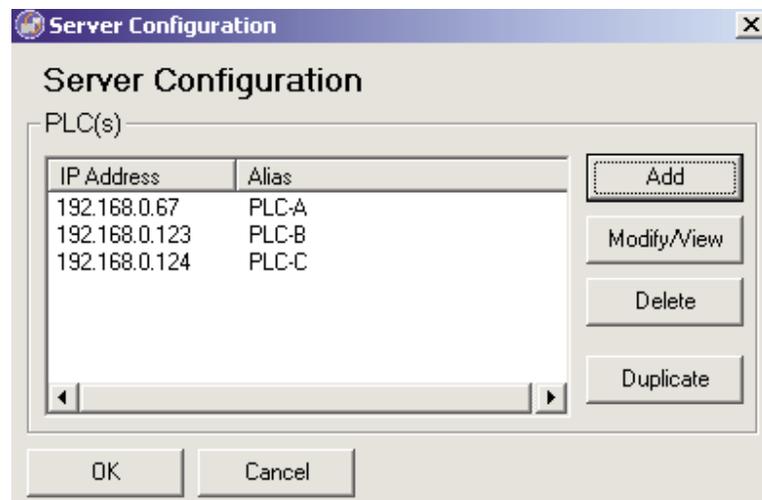
Go to menu:

OPTIONS ->
CONFIGURE
SERVER



The Server Configuration window will open. If no PLCs have been configured, then the PLC list will be empty.

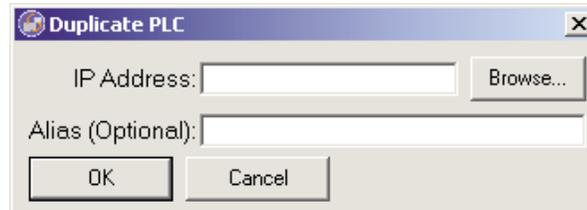
In the example below, three PLCs have already been configured for the Server.



Select the PLC to be duplicated, and click **DUPLICATE**.

DataWorx PLC

The Duplicate PLC dialog box will open with prompts for the new PLC's IP Address and Alias.



Enter the necessary information.

Click **OK** to create the duplicate PLC with the specified IP Address and Alias. The Duplicate PLC dialog box will close and the new PLC will be listed in the Server Configuration window.

Click **CANCEL** to discard the duplicate PLC.

6.2.7 Listening

The DataWorx PLC Server maintains "Listening" and "Not listening" states for PLC input. The listening status may be changed from the Monitor as well as from the Server program.

Changing the listening state can be useful when in the process of installing new PLCs or changing the PLC configuration to prevent the Server from receiving irrelevant data.

The Server's listening state is displayed in the "Status" section of the Main Monitor window.

Listening State

To begin receiving data, click **START LISTENING** from the Main Monitor window. Note: If the button label reads "Stop Listening," the Server is already in a Listening state.

Not listening to PLCs

Start Listening

If successful, the option button will be labeled "Stop Listening" and the Server state will be "Listening to PLCs."

Listening to PLCs

Stop Listening

Not Listening State

To make the Server stop listening, click **STOP LISTENING**.

Listening to PLCs

Stop Listening

If successful, the option button will be labeled "Start Listening" and the Server state will be "Not Listening to PLCs."

Not listening to PLCs

Start Listening

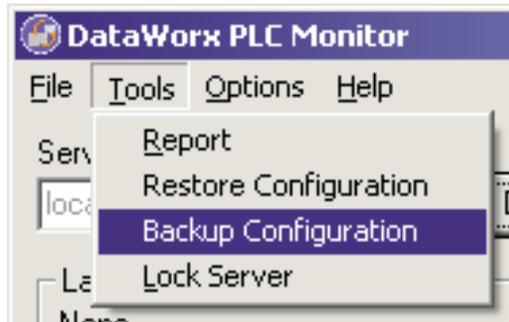
6.2.8 Backing up and Restoring

Backing up the Server configuration allows the user to later safely restore all Server settings in the event of a hardware failure.

Backing up the Server Configuration

To backup a configuration, go to menu:

TOOLS ->
BACKUP
CONFIGURATION

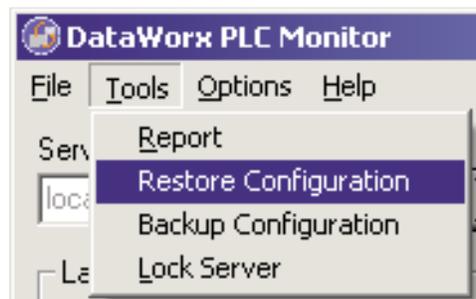


A Save As window will prompt the user for a path and filename. Select the desired path and specify a filename. Note where the configuration file will be saved for future restorations, and click **SAVE**.

Restoring the Server Configuration

To restore a configuration, go to menu:

TOOLS -> RESTORE CONFIGURATION

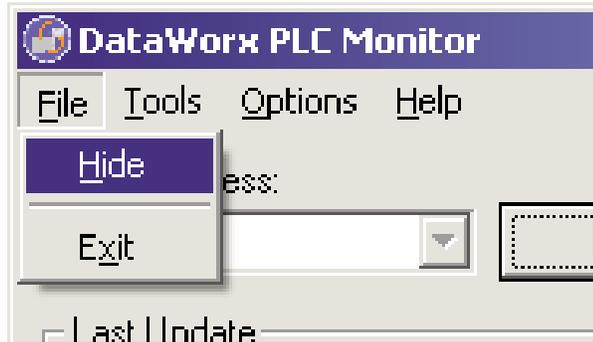


A standard Open window will prompt the user for a path and filename. Select the desired path and filename. Click **OPEN**, and the Server settings will be restored per the selected file.

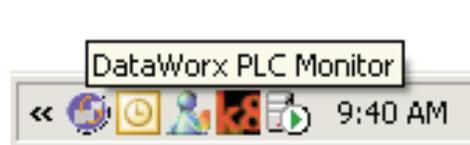
6.2.9 Hiding

Hiding is a convenient feature for temporarily placing the Monitor out of view for later access. Go to menu:

FILE -> HIDE



The DataWorx PLC icon will appear on the task bar.



The user can restore the application by right-clicking on the DataWorx PLC Monitor icon and selecting **RESTORE**.



6.2.10 Locking / Unlocking

Locking/Unlocking is a useful feature for preventing unwanted PLC configurations and Server listening state changes.

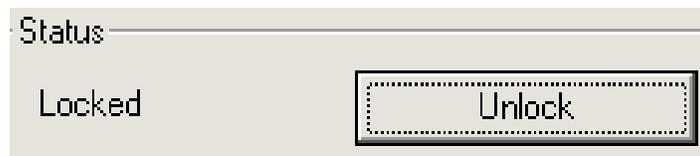
To lock the Server configuration, click **LOCK**.



The Lock Server dialog box will open, prompting the user for a lock Password.



Enter a lock Password, and click **OK**. If successful, the Status section will display a Locked status:



Warning: If the user loses the lock Password, the user will NOT be able to unlock the Server.

To unlock the Server, click **UNLOCK**, enter the lock Password, and click **OK**. If successful, the Status section will display an Unlocked status.



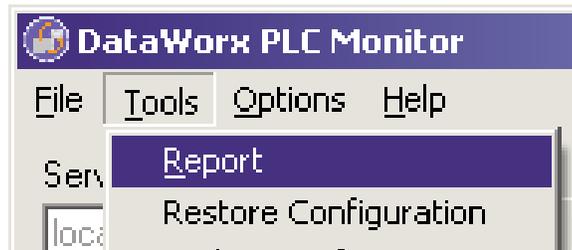
Note: The Server can also be locked/unlocked from the toolbar by selecting: Tools -> Lock Server or Tools -> Unlock Server.

6.2.11 Viewing Data Log Files

The ability to view the data log files is one of the most useful features of the Monitor. Users may view or save files generated by the Server over a network without having physical access to the Server.

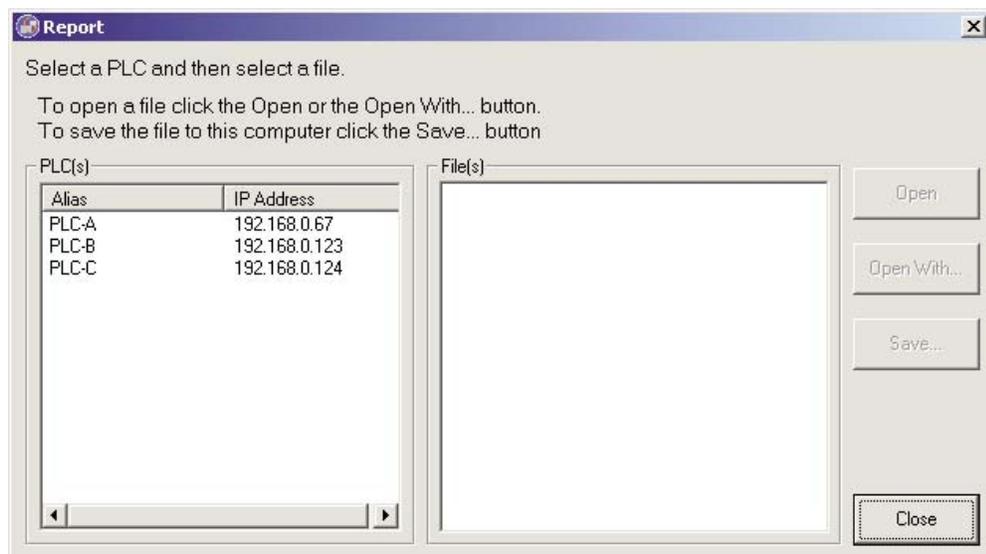
To view the report, go to menu:

TOOLS -> REPORT



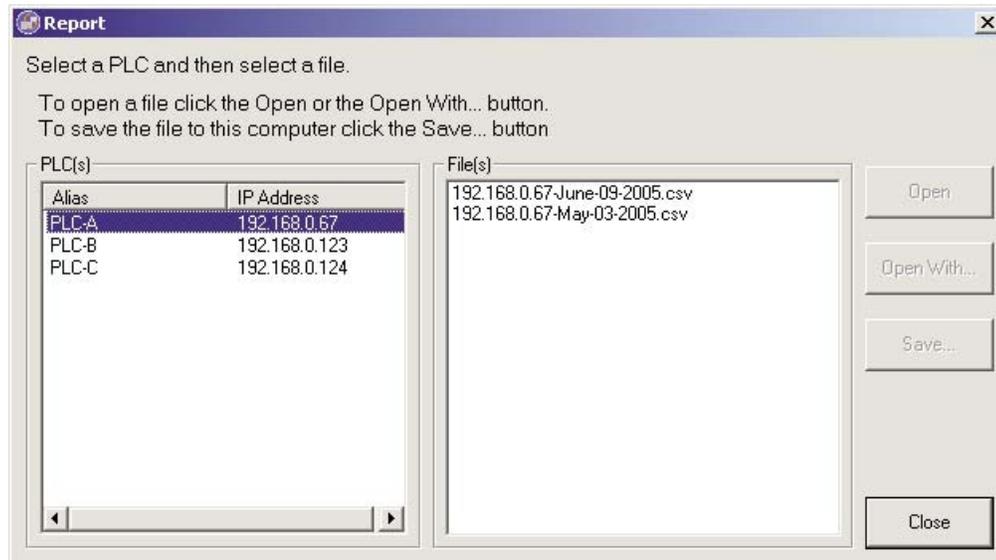
The Report window will open. If no PLCs have been configured, then the PLC list will be empty.

In the example below, three PLCs have already been configured for the Server.



DataWorx PLC

From the PLC(s) list, select the PLC to access its data for viewing.



Next, select a file from the File(s) list, and click either the **OPEN**, **OPEN WITH** or **SAVE** button.

Note the difference between these three options:

OPEN will use the default application to open the file.

OPEN WITH will prompt the user to choose the application in which to open the file, such as Notepad, Excel or another program.

SAVE allows the user to save a copy of any data log file to a location other than the Server. A standard Save window will open, prompting the user for a path and a filename. Once the location for the file has been determined, click **SAVE** to save the file, or click **CANCEL** to cancel. Either way, the original data file will remain in DataWorx for future access.



**** IMPORTANT **** *If the user opens the current log file outside of DataWorx (Example: a log file opened from Microsoft Excel), the application will lock the file and not allow DataWorx to store data in the file. The DataWorx error log will record a "Permission Denied" error.*
