



by Busitech

Automating Data Collection in Quality Window 5



**A guide to selecting the right solution and
configuring the QWSchedule Utility**

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Selecting the right solution:

Quality Window helps you to unlock the power of your data. Imagine how much more powerful your data would be if you could collect more information, more often and more accurately.

To maximize the use of automation data it is important to understand and pick the right solution to meet your needs. The Quality Window Product line provides two solutions and picking the right one is important. Let's step through an outline of those two solutions to help you make the right decision. Understand that you can contact us at any time to help you in this process.

First, the two alternatives for collecting Automation data (DDE/OPC) are:

- Option 1: Using QWSchedule communicating directly through an I/O Server to an Automation System
 - Included in the QW 5 product
- Option 2: Using QWDataHub – a managed gateway to all your automation data
 - This is a separate product from QW 5 at an additional cost

Both solutions do make use of the QWSchedule utility available in the QW 5 product. The difference in the two solutions is the interaction and efficiency of dealing with different Automation Systems.

Note: Both solutions require IO Servers to communicate with an Automation System. These I/O Servers are not included with QW 5 or QWDataHub but can be purchased from the Automation System provider or from third party sources.

Special Note:

If you are using the RSLinx product as a Provider it is recommended that you use the QWDataHub solution. Providers, like RSLinx, typically expect connections to be opened and kept open for long periods of time. If RSLinx is flooded with single requests (opening and closing communications) at a rapid rate the communication link stalls and the I/O Server, which communicates with RSLinx would have to be restarted and may cause the loss of data.

Option 1: QWSchedule direct link to Automation Systems

- Ideal to meet small data collection requirements
 - 10 or less data points (tags) at a time
- Downtime Tracking
- Supplementing manual data collection through Add data screen
- Drawbacks:
 - 1 I/O Server required per work station requesting data
 - May require NetDDE and or DCOM connections depending on configuration

Option 2: QWDataHub – a managed gateway to all automation data.

- Ideal High volume (number of tags) and rapid requests for data
- Supports multiple QW Applications at a time – plant wide
- Single source of all Automation data
- Decreases need for multiple IO Servers
- Secure managed access to automation data

The remainder of this document will deal with the setup and configuration of the QWSchedule Utility, QWSchedule may be used in either option you select the only differences would be in the source of the actual data. Using the QWDataHub option you would be using the tags defined in the QWDataHub application. If you are using Option 1 then the addresses will be the Automation (PLC) addresses accessible directly through the I/O Server.

Overview of the QWSchedule Utility in Quality Window 5

A Fast and Simple Way to Collect Data Automatically

In the past, solutions used to automate data collection were complex, expensive, time consuming and inflexible...often requiring specialized IT resources to create and manage the system on an ongoing basis. Even small applications would require the use of expensive, dedicated servers to collect data for their client applications.

Busitech has made a breakthrough in providing simple yet flexible tools to integrate and automate data collection. These tools are designed to provide the "*rapid change capability*" that you have come to expect using Quality Window. Users can create very flexible solutions in a timely fashion, without the need for specialized and expensive resources. In small applications, data collection can even be done directly within the workstation...avoiding the cost and maintenance of dedicated servers.

Perhaps the best news is the fact that these tools are included with the latest version of Quality Window... at no additional cost!

Introducing QWSchedule

QWSchedule is a stand-alone utility that has been introduced in the most recent maintenance release of Quality Window (QW 5 - Build 530). QWSchedule allows you to define and schedule tasks that include asking Quality Window to automatically collect data from a number of different sources.

The "data" can be any Microsoft DDE/OLE compliant information available anywhere on the network or directly wired to your computer. This can include data within other commercial databases, PLCs, Test Instruments, etc.

QWSchedule can run tasks that collect data on either a regular timed interval and/or event basis. An example of regular timed interval would be to collect data once an hour, or once a day, whereas an example of event based collection would be when a trigger value is detected, such as in the case of when a machine stops (downtime). QWSchedule works in the background, independent of regular QW 5 users.

When QWSchedule is started the first time it automatically places itself in the System Tray in the lower right. Just click on the icon and it will appear on your screen. Simply

select the Task option in the top left and you are ready to create a Scheduled Task.

Creating Different Tasks

QWSchedule allows you to create and save several different tasks and gives you considerable flexibility in defining the options for each particular task.

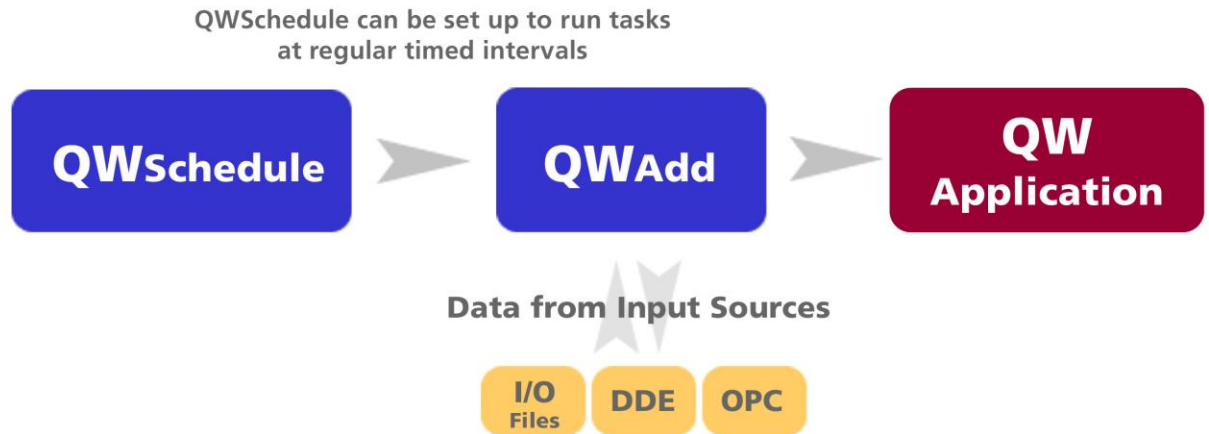
There are two distinct types of tasks that can be created and used in QWSchedule:

- a **Scheduled Task**, which is used to make something happen on a regular timed basis, for example once a minute, once an hour or once a day;
- an **Event-Based Task**, which is based on a trigger value that indicates that something has happened and it is time to perform a specified action.

The variations on these two groups of tasks are endless, and therefore the opportunities to use QWSchedule are limited only to your imagination. Typical examples include:

- Capturing process data with each manual quality check
- End of shift snapshot of downtime/scrap/reliability/production
- Automating labs
- Capturing upstream information (such as making, materials, etc) with downstream information
- Capturing process data with each downtime event,
- Background data collection of process data
- Collection of environmental data such as temperature, humidity, etc, etc.

QWSchedule allows you to automatically run any process that is currently available in Quality Window. This includes adding data to an existing QW Application using the QWAdd feature. Data can be added on a regular timed interval and/or event basis.



You can also use QWSchedule to archive data (copy and delete) from an active QW application file to a historical file using QWUtil. Another example would be to set-up an automatic data backup procedure to run at a specific time each morning (e.g. 1:00 AM).

In the following pages, we will explore the following topics:

- Creating a Scheduled Task
- Creating an Event-Based Task
- Creating a Downtime Task
- Defining Input Sources in a QW Application

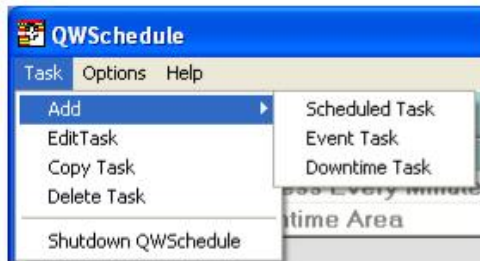
Creating a Scheduled Task to Automatically Collect Data

Perhaps the most powerful use of QWSchedule is to collect data directly from devices like Programmable Logic Controllers (PLC's) and update a QW application data file without operator intervention. Instead of having a person standing at the computer and pressing the Add key every 30 minutes to obtain the data we can have QWSchedule do it automatically for us.

The basis of automating data collection with the QWSchedule program is the use of the QWAdd feature in Quality Window. A key component of the process is the use of Input/Output (I/O) File definitions for variables within a QW 5 application. Defining Input/Output (I/O) Files is explored later in this article, and for now we will concentrate on simply creating a task to Automatically Collect Data.

The following is an example of how you would create a new Scheduled Task to collect data and set it to execute once every minute.

Click on the QWSchedule Icon in the System Tray to launch QWSchedule.

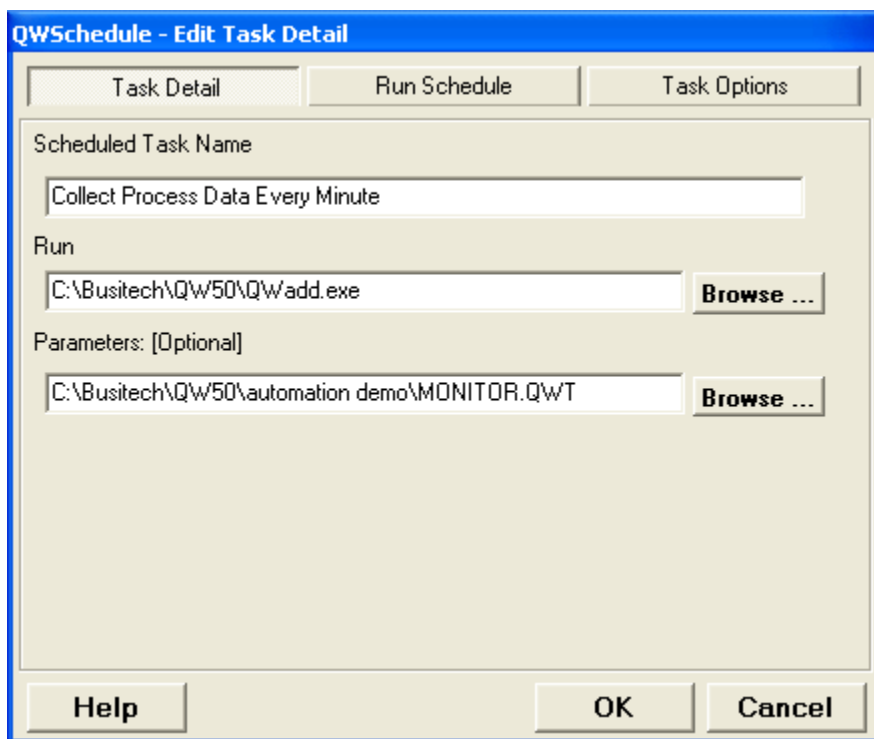


Select the Task option in the top left and then choose Add a Scheduled Task.

Define the Task

Now we just need to supply the necessary information. We use the Edit Task Detail screen to give the task a meaningful name.

We must also establish what program is to be run. In this example we want to run the QWAdd program in Quality Window.



Every time the QWAdd program is run, it will scan the appropriate QW Application template for Input File Sources.

- *This action is equivalent to pressing the Add key in QW50, then Save, then Exit*
- *Records are ReOrganized (ReOrged and ReCalced) after every QWAdd*

Input File Sources, explained in greater detail at the end of this paper, are where the data will be sourced that QWadd will write to the QW Application template.

Finally, you need to establish the Parameters for the Task, and in this example that means identifying which QW Application the new data will be added to.

Selecting the Browse option for either Run or Parameters will allow you to navigate to the appropriate directories to make selections.

Establish a Schedule

We now need to tell QWSchedule when and how often to run this particular Task.

This is done by selecting the Run Schedule tab.

The screenshot shows the 'QWSchedule - Edit Task Detail' dialog box with the 'Run Schedule' tab selected. The dialog has three tabs: 'Task Detail', 'Run Schedule', and 'Task Options'. The 'Run Schedule' tab contains the following fields and options:

- Start Time:** 00:00:00 (with a spin button) and **Daily Start Time [hh:mm:ss]**
- End Time:** 00:00:00 (with a spin button) and **Daily End Time [hh:mm:ss]**
- Interval:** 00:01:00 (with a spin button) OR **Run Once Daily**
- Select Days to Run Task:** A row of checkboxes for Mon, Tue, Wed, Thu, Fri, Sat, and Sun, all of which are checked.
- Use Date Ranges**
- Start Date:** September 16, 2004 (dropdown menu)
- End Date:** September 16, 2005 (dropdown menu)

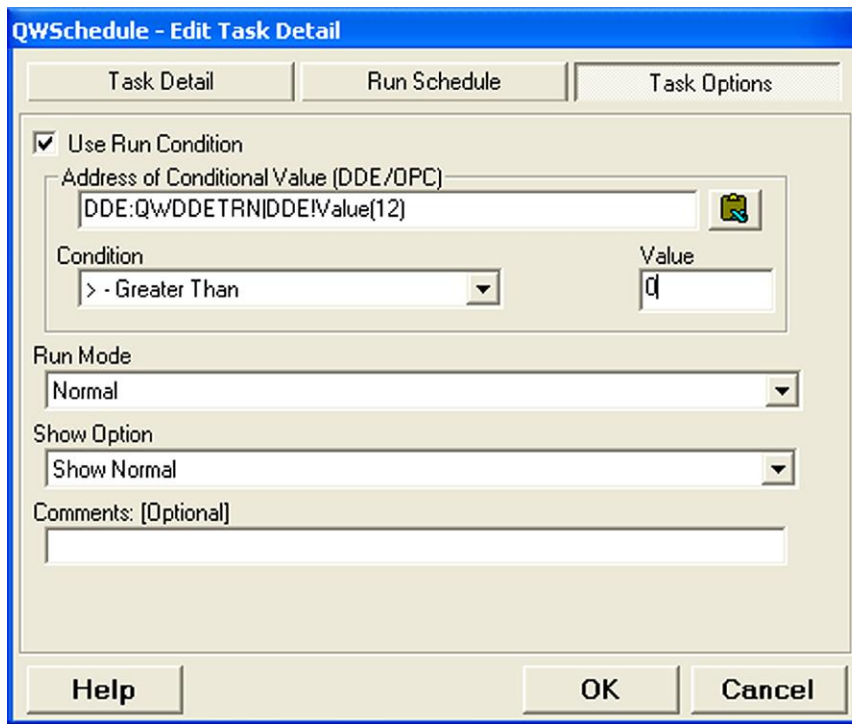
At the bottom of the dialog are three buttons: **Help**, **OK**, and **Cancel**.

For our Task we are only interested in an Interval of 1 minute and that we want it to run Monday through Sunday. As you can see you can get very precise in the running of a Task. For example, we could set a Task to run between 7 am and 11 pm Monday through Friday and by using the Date Range option at the bottom just run it for September through December this year.

Fine Tune the Options

Our last job is to view the Task Option screen. This screen lets you specify any special options when running this Task. For instance the Show Option lets you control what is displayed on the screen when the program in the Task Detail-Run option is executed. The pull down menu lets you select from Normal, Maximized, Minimized or Hidden views. The Run Mode defaults to Normal unless a problem in running the Task is

encountered and then the Special option can be tried to overcome the problem. Comments are optional and this allows you to provide any information you consider important for this Task.



The Run Condition options add a very useful capability for controlling individual Tasks. You can specify an address in the Address of Conditional Value in conjunction with the Condition and Value fields that you want QWSchedule to check before actually executing the Task. This will help you avoid writing blank records to a QW Application when the Equipment/Line is not currently running. Another example might be you only want to collect data if the speed of the line is above a certain value.

When you have finished setting all the options just select OK and the Task will be saved.

Activating a Task

To activate a Task, just click in the check box beside the Task in the QWSchedule Status Window. Existing tasks are colour coded to display their status:

Green	Task is active
Yellow	Task is running
Red	There is a problem with the Task (<i>e.g. the DDE/OPC source is not available</i>)
Grey	Task is currently inactive

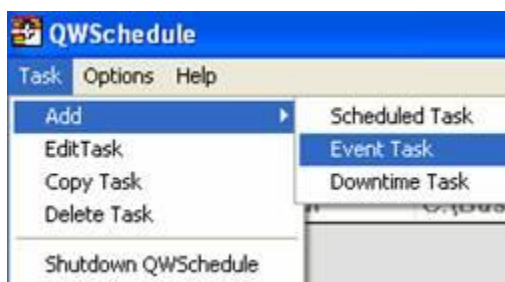
Creating an Event-Based Task

There are two variations of Event Tasks available in QWSchedule. The first is based on a trigger value and when that value changes it is time to perform a specified action. This could be a value in a PLC that indicates the end of a shift has occurred and it is time to run the end of shift report.

In the following example, we want to run an End of Shift Report when the shift changes.

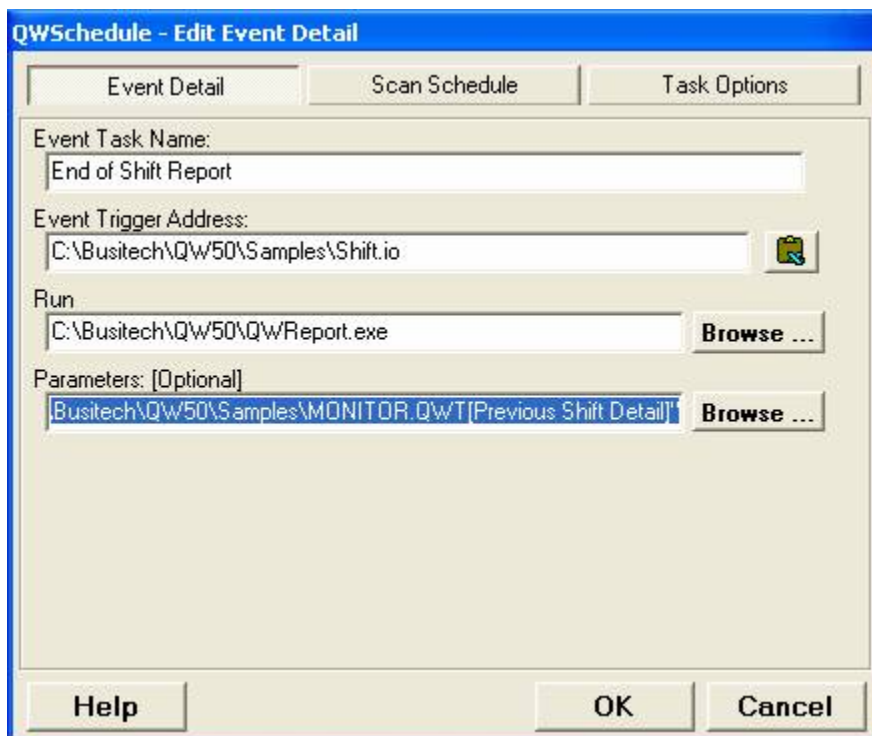
Click on the QWSchedule Icon in the System Tray to launch QWSchedule.

Select the Task option in the top left and then choose Add an Event Task.



Define the Task

We use the Edit Task Detail screen to give the task a name that clearly indicates what the task is for. In this case, we will name the task “End of Shift Report”.



In the next field you define the Trigger Address. This can be a DDE or OPC address in a PLC or as in this case a QW Input/Output file called Shift.IO.

In this example, you have designed your QW application with a field to note which shift is working. When a new shift begins, the first task of the shift leader is to add a record in the QW application noting the change. QW stores that value in an Input/Output file called Shift.IO. The IO Files continues to store this value until the next shift starts, when a new value would be recorded.

QWSchedule will continue to monitor this file and when the file changes the Task will be triggered. You must provide the complete location information for the file to ensure the correct file is being monitored.

C:\Busitech\QW50\Samples\Shift.io

Once the Task is triggered you need to define what action you want QWSchedule to take. In the Run field you specify the program or activity you want performed. In this case we want to run the program QWREPORT.EXE, which is located in the Busitech/QW50 directory on the C: drive. The Browse option to the right of the field can make this selection easier.

C:\Busitech\QW50\QWReport.exe

Along with specifying the program there options that can be specified to clearly define the task you want to perform. These options are sometimes called command line options and in this case we want QWREPORT.EXE to run a report for the Monitoring application and specifically we want the “Previous Shift Detail” Report to be printed on the default printer.

PRINTER C:\Busitech\QW50\Samples\MONITOR.QWT[Previous Shift Detail]

Each program you place in the Run option may have a variety of command line options. You should investigate these options to select the best method of accomplishing your objective.

Establish a Schedule

We now need to tell QWSchedule when and how often to run this particular Task. This is done by selecting the Scan Schedule tab.

The screenshot shows the 'QWSchedule - Edit Event Detail' dialog box with the 'Scan Schedule' tab selected. The dialog has three tabs: 'Event Detail', 'Scan Schedule', and 'Task Options'. The 'Scan Schedule' tab contains the following fields and options:

- Start Time: 00:00:00 (with a spinner control) and Daily Start Time [hh:mm:ss]
- End Time: 00:00:00 (with a spinner control) and Daily End Time [hh:mm:ss]
- Interval: 00:00:00 (with a spinner control) OR Run Once Daily
- Select Days to Run Task: Mon, Tue, Wed, Thu, Fri, Sat, Sun
- Use Date Ranges: Start Date: September 28, 2004, End Date: September 28, 2005

At the bottom of the dialog are three buttons: 'Help', 'OK', and 'Cancel'.

This screen allows you to clearly define when this task should be available to be executed. For instance in this example we know we only run a 5 day a week operation so we only want the task to be available Monday through Friday.

Fine Tune the Options

The last option screen for you to consider is the Task Option screen.

The screenshot shows the 'Task Options' tab of the 'QWSchedule - Edit Downtime Event Detail' dialog box. It features three tabs: 'Downtime Detail', 'Scan Schedule', and 'Task Options'. The 'Task Options' tab is active. It contains a checked checkbox for 'Use Run Condition'. Below this is a text field for 'Address of Conditional Value (DDE/OPC)' containing 'DDE:QWDDETRNDDEIValue[22]'. A 'Condition' dropdown menu is set to '> - Greater Than', and a 'Value' text field contains '0'. There are also dropdown menus for 'Run Mode' (set to 'Normal') and 'Show Option' (set to 'Show Normal'). A 'Comments: [Optional]' text area is empty. At the bottom are 'Help', 'OK', and 'Cancel' buttons.

Here you can set the Task to only run if a certain condition is met (Use Run Condition). This is useful if it is important that this task only run if the Line is currently running. In other words, you do not want the Task to run if the Line is currently on a Maintenance shut-down.

You can also set how the task is to be displayed on the screen when it is executing. You may not want anything to show on the screen.

Creating a Downtime Task

The second type of Event task is also trigger-based but the first change of the value starts a timer and the second stops the timer and then performs an action. This type of Event task is ideally suited to track downtime for a piece of equipment or manufacturing line.


The key to this type of Event Task is the **Event Trigger Address**. QWSchedule will monitor this address to detect a change. Once a change is detected QWSchedule will start a timer. When QWSchedule detects the field has changed values again the QW5 Downtime application will be updated with the downtime information.

The **Trigger Acknowledgement Address**, is optional, and is used to send back to a specified DDE or OPC address the value of the Event Trigger, indicating that QWSchedule has completed processing that downtime event. It is a form of handshake that helps to maintain communication between the PLC and QWSchedule

QWSchedule - Edit Downtime Event Detail

Downtime Detail Scan Schedule Task Options

Use Run Condition

Address of Conditional Value (DDE/OPC)
DDE:QWDETREN\DDE!Value(22) 

Condition: > - Greater Than Value: 0

Run Mode: Normal

Show Option: Show Normal

Comments: [Optional]

Help OK Cancel

Defining Input Sources in a QW Application

As noted above, QWSchedule calls on the QWAdd feature in Quality Window to automatically collect data. For QWAdd to successfully collect data, one or more variables within the specified QW Application template must have an Input File specified for it. The Input File tells the QWAdd process what value to establish for that variable in the record that is about to be written. Every variable within a QW template can have an Input File specified for it.

The following notes explain how you can define Input Sources in a QW application.

Getting Started

Input Files can be specified for each variable using the QWSetup program.

Choose which existing QW Application you wish to modify, and then use QWSetup to modify each necessary variable.

Input Files can be specified with 3 different sources: a simple Input/Output (I/O) file, a Dynamic Data Exchange (DDE) address, or an Open Process Control (OPC) address.

I/O Files

Quality Window allows you to set up a simple data file to collect input/output data. These files are called I/O Files. You can specify an I/O file as the input source, such as:

C:\busitech\qw50\samples\team.io

- where a single value may be stored within this file

I/O input files are typically used to receive data from RS232 devices like a weight scale.

Dynamic Data Exchange (DDE) address

You can specify a DDE application source file as the input file, such as:

DDE:EXCEL|c:\MyWorksheet.xls!R1C3

- where Excel is the DDE application
- where c:\MyWorksheet.xls is the spreadsheet file
- where R1C3 is Excel's way of pointing to Cell C1 (Col 3, Row 1)

To gain access to PLC sources a bridge is required (called an IO Server). These servers are typically software gateways supplied by Control System suppliers like Allen-Bradley, Siemens or Honeywell. These IO Servers receive the data request from QW 5 and then talks to the Control System to supply the data.

Open Process Control (OPC) address

You can specify an OPC application source file as the input file, such as:

OPC://Server1/ICONICS/BatchViscosity

- where Server1 is the name of the server (computer)
- where ICONICS is the name of the OPC Server Application
- where BatchViscosity is the item or tagname

When QWAdd requests data for a particular variable through an Input File source, the current data value from the file, DDE or OPC location is retrieved and used as the variable value for the new record being added.

More Information

More information on Quality Window and its associated features can be found on the Busitech website at www.Busitech.com, where you can also download a full working version.

Alternatively, you can contact the Busitech support team at (613) 938-0900.

