

Quickstart Tutorial V7.20

In approximately one hour, completing this tutorial will give you a basic working knowledge of CitectHMI/SCADA version 7.20 software.

Learn how to build a small project, configure dynamic graphics, create alarms and trends, and then run your project like a real plant.

This tutorial will also show you some shortcuts that, over time, will save you far more than the one hour you may take to complete the exercises inside.

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Quickstart Tutorial

Welcome, and thank you for purchasing CitectHMI or CitectSCADA. We would like your experience with the product to be a pleasant one, so we have created this tutorial to help new users get familiar with some of the fundamental features of the product.

The tutorial is designed so that you can complete it in a couple of hours. The tutorial is not intended as a substitute for attending a CitectHMI/SCADA training course. We encourage you to attend a training course to complete your basic training, learn how to use time saving tools or go on to learn some of the more advanced features of the product.

This tutorial assumes that you have already successfully installed the CitectSCADA product on your computer. You do not require a Citect license to complete this tutorial.

Repetition is an important part of learning or memorizing. One way you can speed up your familiarization is to take a few minutes to click through all the menus in the toolbar and (briefly) try and figure out what each item might be for. If you can't make sense of what you see don't worry, just move on to the next one. You may not consciously remember everything, but it helps to set a framework for when you revisit these items in the tutorial and in this way you will remember them much more quickly.

By completing this tutorial you will learn the following...

- Creating a New Project
- Setting Up Communications with a PLC
- Adding and Configuring tags
- Creating New Graphic pages
 - Use Templates
 - Button Commands
 - Disabling Buttons
 - Dynamic Symbols
 - Drawing objects
 - Manipulating objects Copy, Paste, Align, Send to Back, Color Fill, Control Commands,
 - Setting values
 - Drawing Text
 - Displaying analog values
 - Drawing Pipes
 - Grouping Objects
 - Defining Alarms
 - Configure an alarm page
 - Storing Trend Data
 - Configuring a trend page
- Operating Runtime Displays
- Applying Security
- Using Administration Tools
 - Creating Runtime Menus
 - Tag Debug Utility
- Backing up and restoring a project



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Definition of Terms

Click	= Briefly press left mouse button
Double Click	= Press left mouse button twice – quickly
Right Click	= Briefly press right mouse button
Check	= A tick or cross in an options box 
Type Text	= Type in the word Text
Drag	= Position mouse, click and hold left mouse button, move the mouse, then release the mouse button
Alt+Tab	= Press the Alt key, hold it down, then press the Tab key



Single Click

Right Click

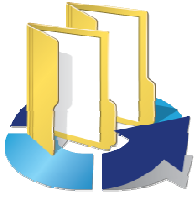
Double Click

Click and drag

Type

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CitectHMI/SCADA is made up of a several configuration tools and a runtime section.



Citect Explorer – Top level configuration interface



Citect Project Editor – Mainly used for entering database type information



Citect Graphics Builder – Used for creating graphics



Citect Runtime – Provides the active operator interface

You can switch between these applications by:

1. Using the icons at the top left of each application, or
2. Holding down the Alt key, then pressing Tab until the application you want is selected, then release the alt key (Alt+Tab), or
3. Clicking on the icons that appear on the Windows task bar as shown below.



To make sure that you have selected the correct icon you can let the mouse hang over the icon for about 2 seconds and a tool tip will appear to guide you.

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Create a New Project Folder

Run the Citect Explorer.

Click on Start

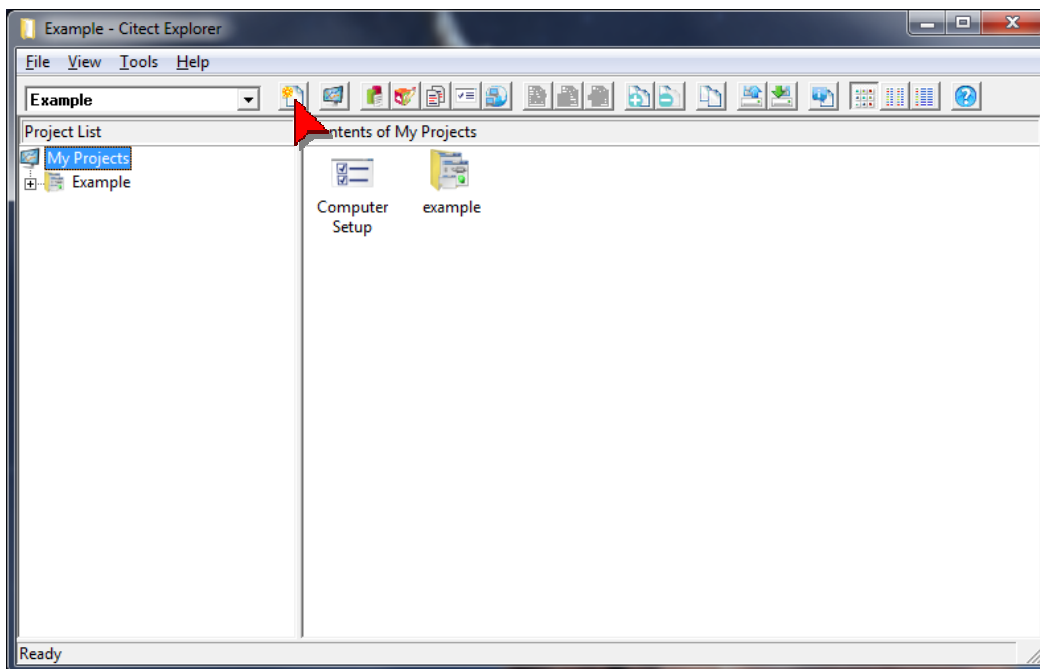
Click All Programs

Click Citect

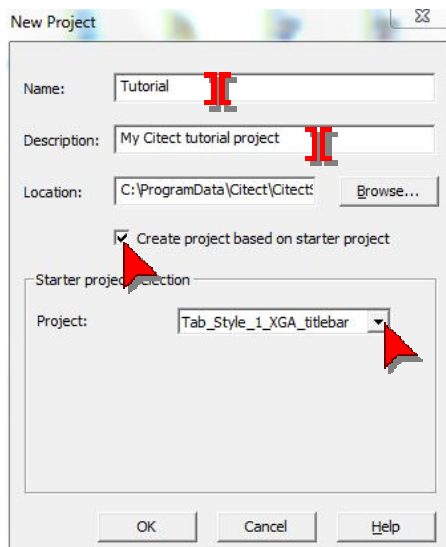
Click CitectSCADA 7.20

Click CitectSCADA Explorer

On the Tool Bar, click on the New Project icon



In the New Project Dialog Box, type "Tutorial" in the Name field to give the new project a name, give it a description, then check 'Create project based on starter project' checkbox and select XGA title bar from the Project menu. Click OK to create your starter project.



As you go through this tutorial you might like to click on the Help button located on many of the dialogs as this will show you some of the other options available to you that are not covered by this tutorial.

Project Folders store all of the CitectSCADA files for your project including graphic pages, tag definitions, code etc.

Clicking on a different project in Citect Explorer immediately changes the project you are working in.

You can combine multiple configuration projects into a single runtime project using the "project include" feature described in the online help.

TIP

Use the Example project to get ideas and learn how things are made by pulling them apart.

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Project Initialization



Before we can build too much of our project, we have a small amount of house-keeping to do. This is required to setup the environment upon which the project will run. This includes setting up the server (stand-alone in this case), ready for when we configure other items. We will setup:

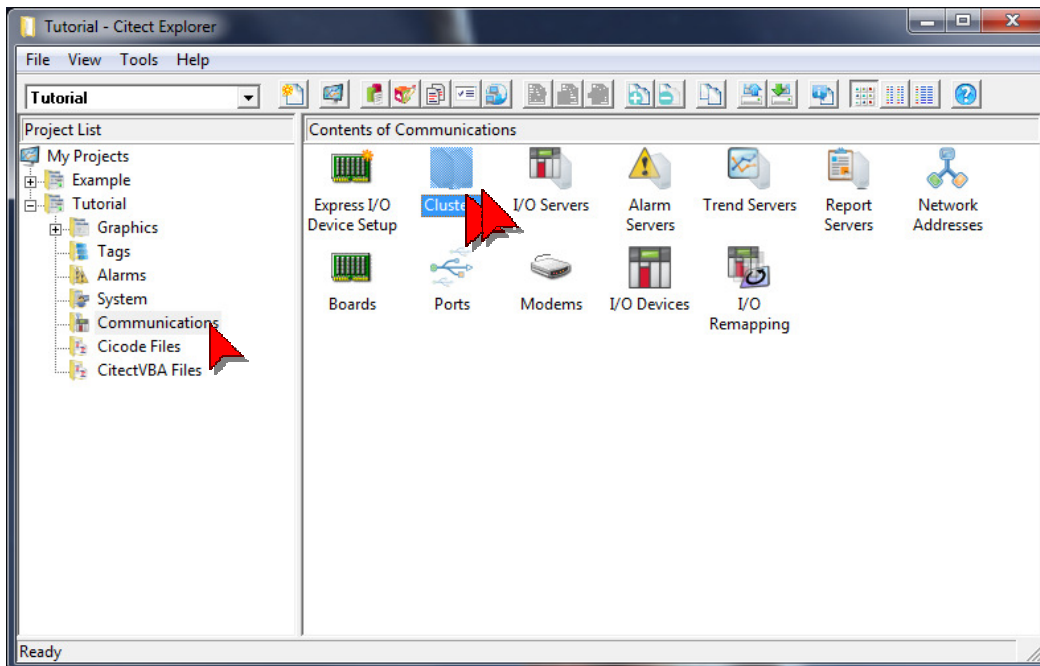
- A Cluster
- A Network Server (this computer)
- Server definitions for alarm services, reports services, trend services and IO (data) services
- An IO Device which the project will communicate with
- A Windows linked user-group to allow us to run the project

After that, we can build graphic pages, alarms, trends and so on utilizing this infrastructure.

Configuring Clusters

Clusters define where server processes (IO communications, data logging, alarming, etc), are run, and how different server processes interact with each other for redundancy purposes (refer to the online help for more details). Every CitectSCADA system must have at least one cluster defined, with related Network Addresses and Server roles also defined. When you have created a starter project, Citect has already created a cluster for us. Let's go and customize that cluster and give it a different name.

Expand your project tree on the left-hand side of Citect Explorer and select Communications. Then double-click on Clusters.



If the Project Editor does not appear, then use Alt+Tab until it appears.

CitectSCADA allows you to quickly and easily switch between different projects, simply by selecting them in the Project List.

TIP

Make sure all pages are saved or closed in the Graphics Builder before changing projects.

When you backup a project, everything related to that project, including Cicode or VBA script, is backed up and easily transported to other computers. The only exception is any 3rd party items which need to be installed separately such as ActiveX objects.

TIP

When networking your system, the project does not need to be copied to every computer. Refer *projects*, *Managing your projects*, *Linking projects*

TIP

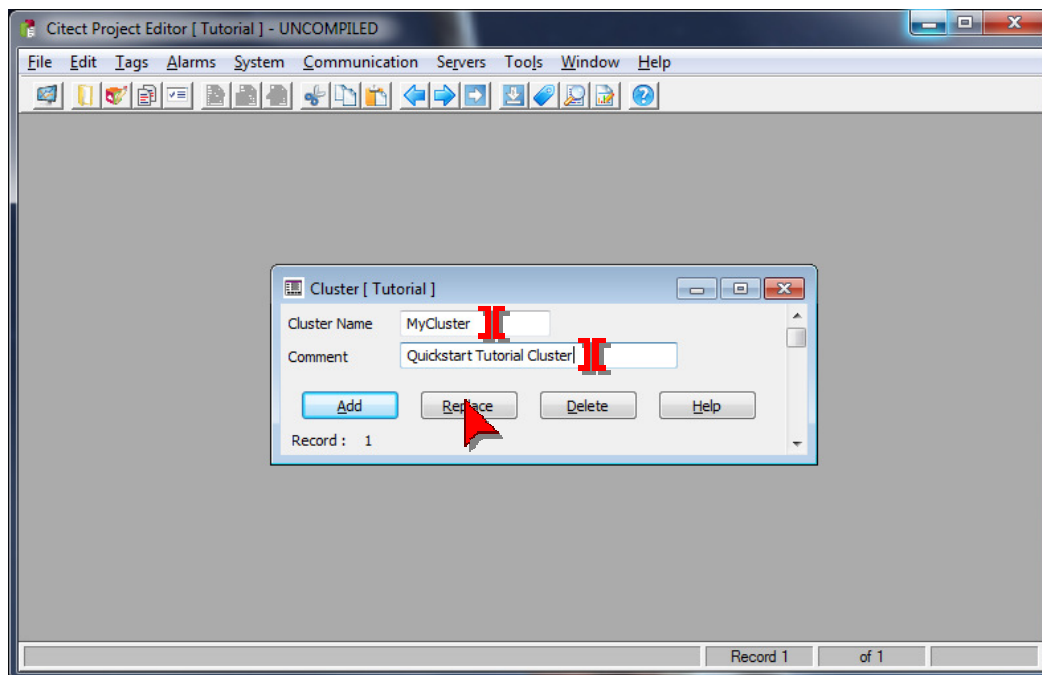
When running extremely large systems, the server roles can be distributed across multiple network servers to manage the load and performance of the system.

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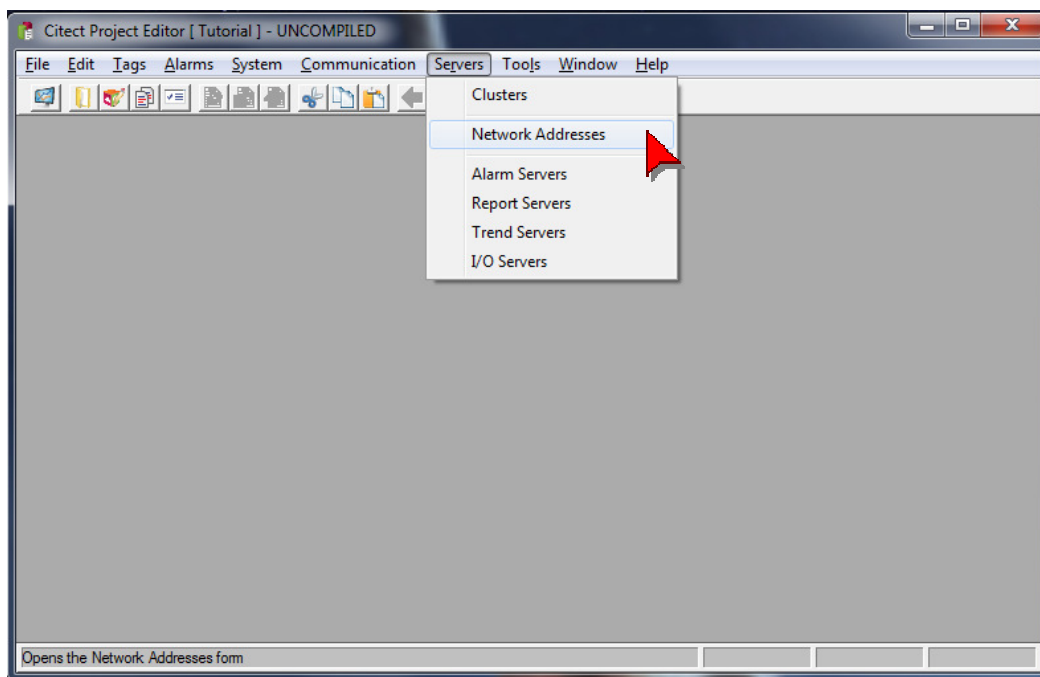
Configuring Clusters continued...

In the Clusters form that appears, change the existing cluster name from Cluster1 to MyCluster; give it an appropriate description in the Comment field, then click Replace.



Close the Clusters window by clicking on the  or pressing ESC.

From the pull-down menu at the top of the Citect Project Editor, click on Servers, then Network Addresses.



IMPORTANT

Do NOT press ENTER before filling in all the required fields in a form. Each time you press ENTER a new record will be added to the project creating duplicates which will cause compilation failures.

Similarly, make sure you only single-click the Add button, rather than double-clicking, otherwise duplicate records will be added causing complication failures.

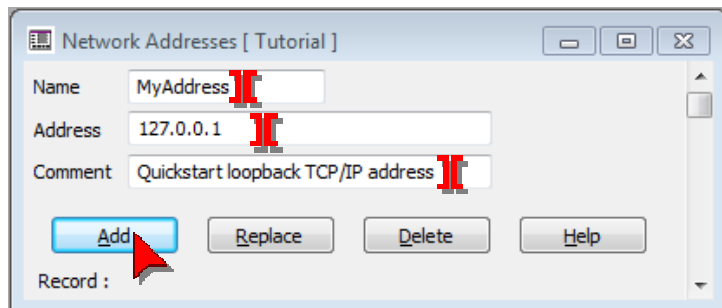
For learners, it is better to use the Add button instead of the ENTER key. If you add an extra record by mistake, you can use the Delete button to mark it for deletion. Once marked for deletion the record will be ignored.

If you press delete by mistake you can press it again to undelete. To view records marked for deletion go to Tools, select Options and check Show Deleted.

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Configuring Clusters continued...

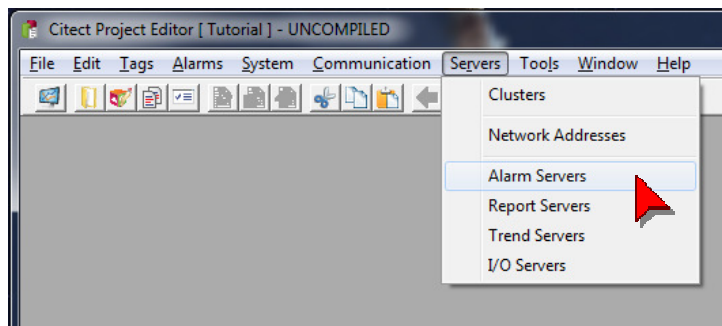
In the Network Addresses form, enter the Name "MyAddress", the Address "127.0.0.1", and an appropriate Comment.



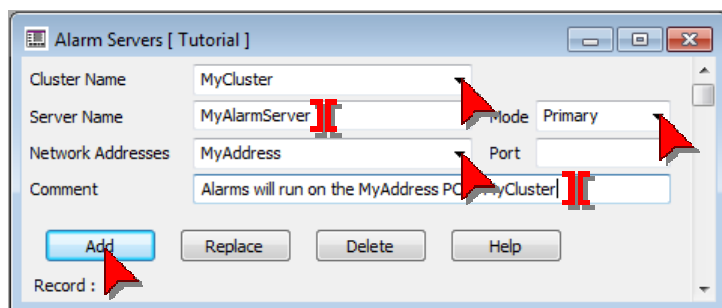
When you are finished, click Add, then close the form. This assigns the loopback TCP/IP address to the system which is appropriate for Standalone systems only. We will then use that address for our server roles.

We now need to assign both the Cluster and the Network Address to the various server roles that are required on this Citect system. This includes IO Communications, Alarming, Trending and Reporting roles.

From the Servers menu select each of the server tasks in turn, and configure them as shown below:



Use the pull-down lists where provided to minimise the chance of mistakes.



TIP

Network Addresses define which computers are available on the network to operate as Citect Servers.

We can identify these computers by TCP/IP address, or computer name.

The universal loopback address 127.0.0.1 is only appropriate for standalone systems with no clients.

For networked or redundant systems, refer to the online help for details on how to configure additional Network Addresses and use them in your Server definitions

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Configuring Clusters continued...

This identifies the Alarm Server process to run on the computer with *MyAddress* TCP/IP address, within the *MyCluster* server group, in the *Primary* mode. The Server Name "MyServer" will be used by networked clients to connect to this server to acquire the alarm information for display purposes. Continue for Report, Trend and IO Servers as shown below:



The Tutorial project defines a single PC inside of a single cluster, and due to the loopback TCPIP address, is incapable of communicating to other CitectSCADA nodes or clients.

Refer to the online help for details on Primary and Standby server functions, and Clustering options for networked systems.

Report Servers [Tutorial]

Cluster Name: MyCluster

Server Name: MyReportServer

Mode: Primary

Network Addresses: MyAddress

Port:

Comment: Reports will run on MyAddress PC in MyCluster

Buttons: Add, Replace, Delete, Help

Record: 1

Trend Servers [Tutorial]

Cluster Name: MyCluster

Server Name: MyTrendServer

Mode: Primary

Network Addresses: MyAddress

Port:

Comment: Trends will run on MyAddress PC in MyCluster

Buttons: Add, Replace, Delete, Help

Record: 1

I/O Server [Tutorial]

Cluster Name: MyCluster

Server Name: MyIOServer

Mode: Primary

Network Addresses: MyAddress

Port:

Comment: Communications will be serviced by MyAddress PC

Buttons: Add, Replace, Delete, Help

Record: 1

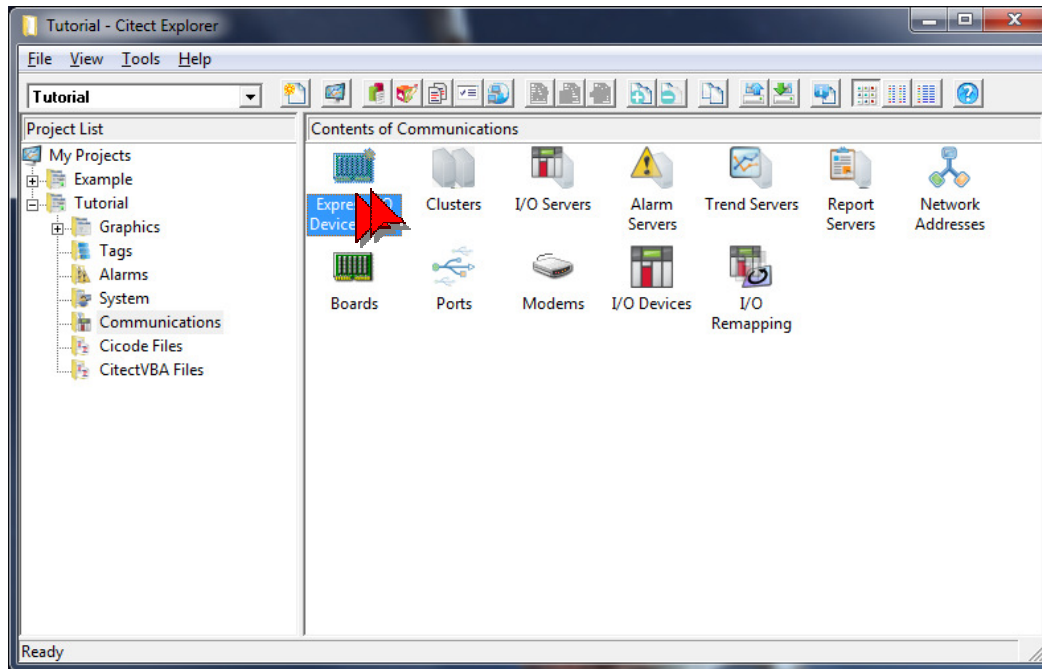
We have now completed our Server setup and are ready to define our communications path to the PLC.

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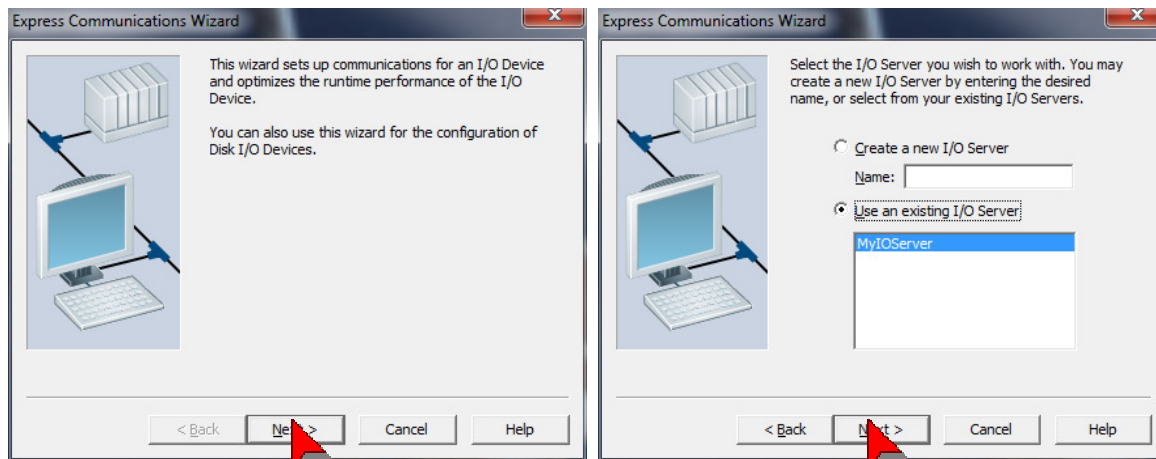
Configure an I/O Device

Use Alt+Tab to return to the Citect Explorer. Make sure the Tutorial project is selected in the project list on the left-hand side and that the Communications folder is open.

Double click on Express I/O Device Setup.



On the Express Communications Wizard, just press the Next button for the first three steps, making sure "MyIOServer" is selected as the existing I/O Server in the second step.



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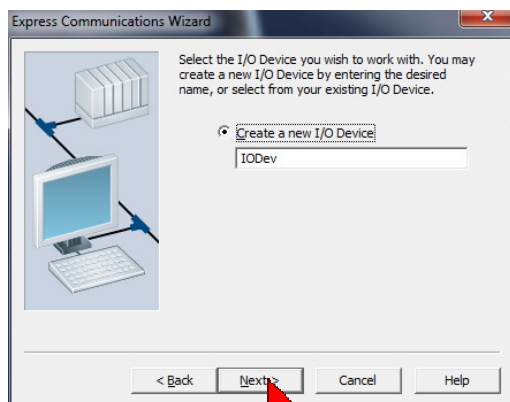
Configuring an I/O Device continued...



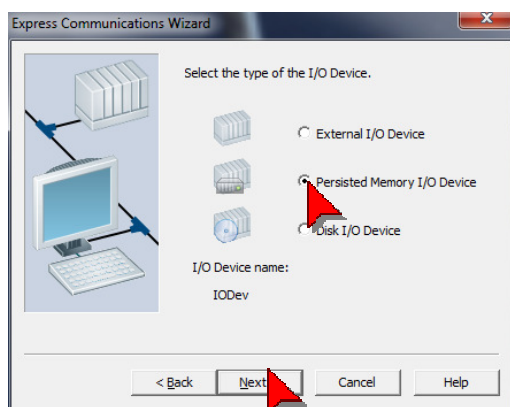
Persisted Memory I/O Devices are serviced by the Citect I/O Server, which means all networked clients are looking at the same data. Data values are retained over a product shutdown as they are persisted to the I/O Server's hard drive.

Persisted Memory I/O Devices are an improvement on the older-style Disk I/O Devices, especially when utilised on redundant (or multi-redundant) servers.

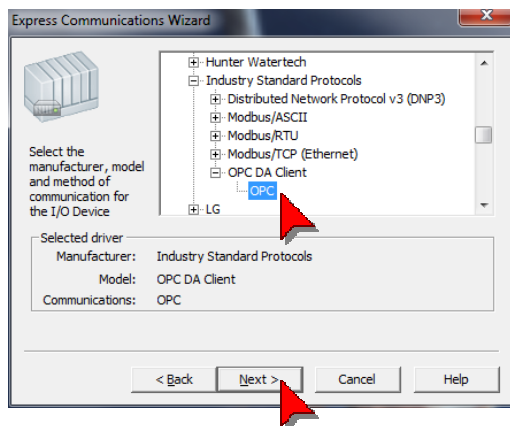
Local Tags are serviced by each individual Citect node, so each client is looking only at its own data. Local Tag values are not retained when the Citect node is shutdown.



On the fourth step, click Persisted Memory I/O Device, then click Next. This configures the system to use a memory based device which persists to disk instead of a real-world device. Persisted Memory I/O devices are useful for simulation and testing situations, as well as for storing recipe or other information at the SCADA level instead of in the PLC.



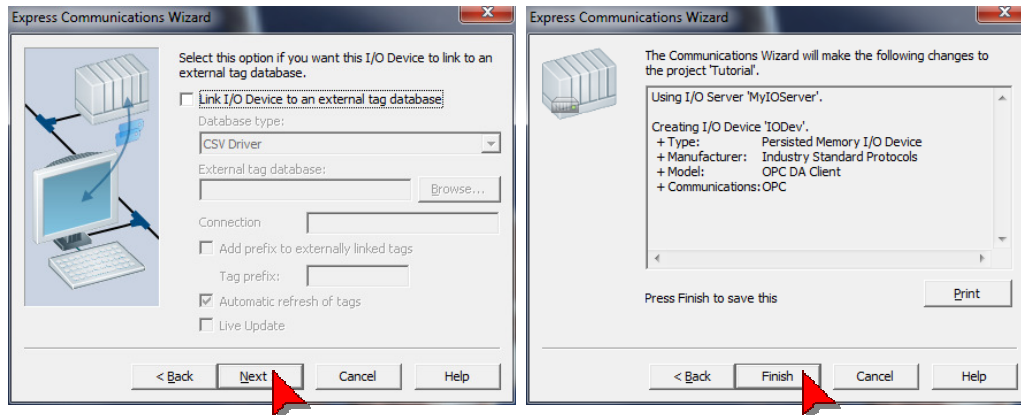
On the fifth step, select the default OPC Protocol by clicking on it, then click Next.



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Configuring an I/O Device continued...

On the final two screens you just need to press the Next & Finish buttons.



Your system has now been configured to access an emulated PLC to write and read data. Now we need to configure the tags in this PLC that the system will use to control equipment. In this tutorial we will be controlling a pump, its mode, and its speed.

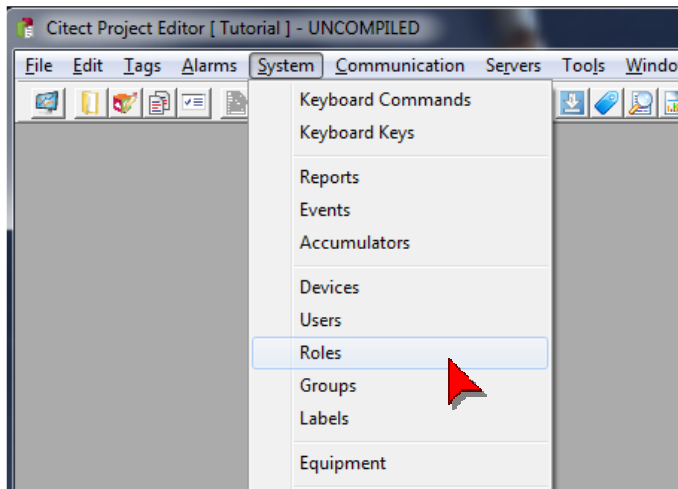
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Configuring Administrator Security

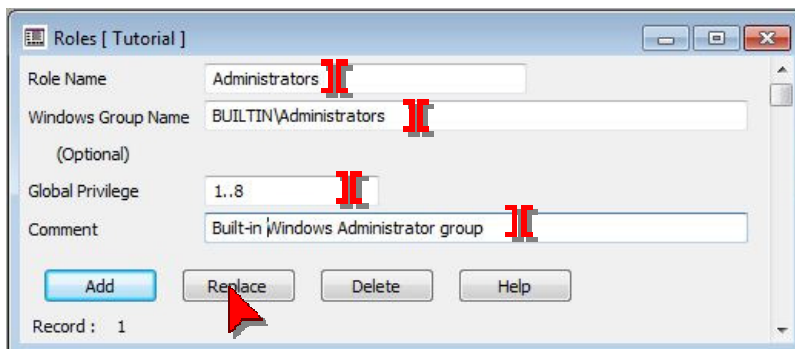
Most projects require secure user authentication before they will allow control activities to be executed from the HMI. In Citect this can be achieved via local users, or Windows linked users or groups.

Citect has a built in role called Administrators, which is automatically generated when you create a new starter project. The existing role is linked to the Windows Administrator's group on your PC (this assumes you have access to a Windows user that is a local administrator of the computer. If not, modify the Windows Group name in the configuration shown below to match whichever Windows group is appropriate for your setup. For example, "Users" or "Power Users").

On the Project Editor Menu, click on System then click on Roles.



Change the Roles if you prefer by editing individual fields and click Replace. Alternatively, you can simply use the built-in role for your Tutorial project.



This role has been configured for maximum security privileges (1 through 8), throughout the project.



CitectSCADA supports both local (internal) users and Windows linked users.

Local users are managed from within the Citect configuration environment.

Windows users (referred to as Roles in Citect) are managed from either the Windows operating system, or a networked domain server.

TIP
There are additional options for security allocations. Press **F2** to view the additional parameters available for Users and Roles.

Global privileges assign access rights across all areas of the project.

The extended menu allows access rights to be established on a per-area basis. This allows a 'matrix' of privilege levels and areas which are useful on larger scale projects.

TIP
CitectSCADA requires at least one user or role to be defined for a project. It is a good idea to define the Windows Administrator group for global privileges on all of your projects.

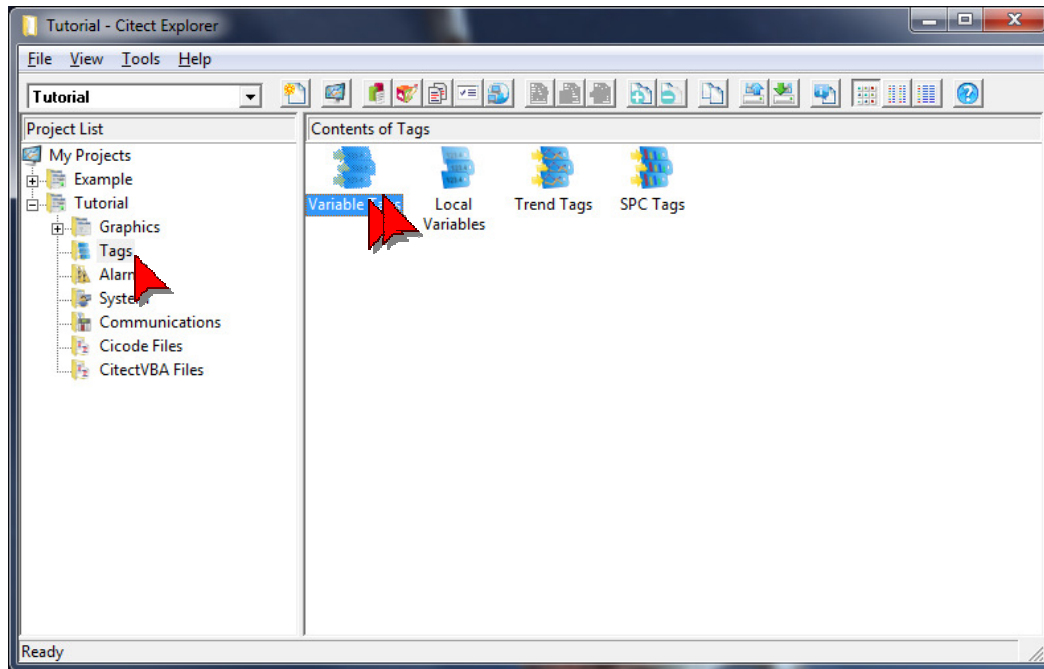
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Configuring Tags



Variable Tags are a core building block for a CitectSCADA project. Tags provide the link between the operator and the real-world. We will create three tags to represent our pump, a Run/Stop control tag, an Auto/Manual control tag and a Speed control tag.

Making sure the Tutorial project is selected, click on the Tags folder. Then double click on Variable Tags in the right-hand pane.



IMPORTANT
Do NOT press ENTER before filling in all the required fields.

Each time you press ENTER a new record will be added to the project creating duplicates which will cause compilation failures.

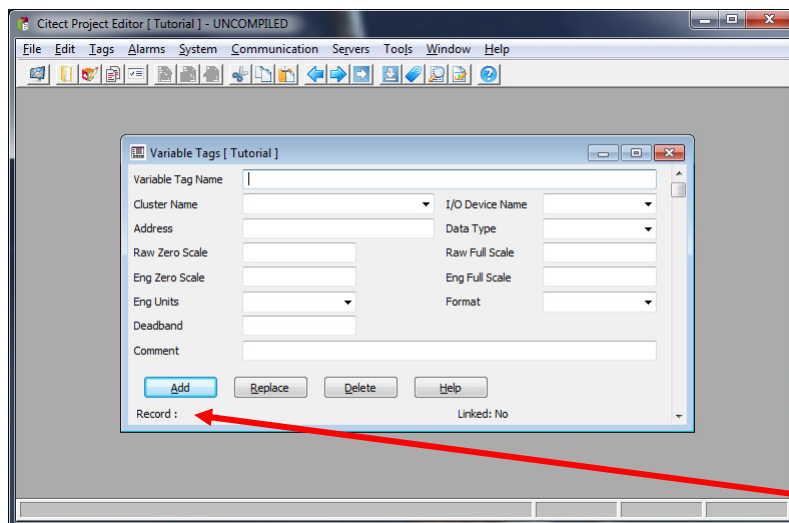
Similarly, make sure you only single-click the Add button, rather than double-clicking, otherwise duplicate records will be added causing compilation failures.

For learners, it is better to use the Add button instead of the ENTER key. If you add an extra record by mistake, you can use the Delete button to mark it for deletion. Once marked for deletion the record will be ignored.

If you press delete by mistake you can press it again to undelete. To view records marked for deletion go to Tools, select Options and check Show Deleted.

To permanently remove deleted records from the project, open the Citect Project Editor, and select Pack from the File menu.

This will bring the Project Editor to the foreground and display the Variable Tags dialog. If it does not appear, use Alt+Tab to switch the view to the Project Editor.



The Project Editor is mainly for editing database type information.

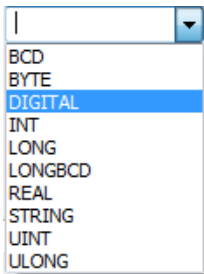
The Variable Tags Database has one record for each Tag you define.

Each Tag has multiple fields. (Variable Tag name, Data Type, Address etc)

You can see the record number indicated in the bottom left of the dialog box

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Configuring Tags continued...



CAUTION
Where a drop down is provided you should use it. If you mistype data into fields that require specific settings you may cause compile errors.



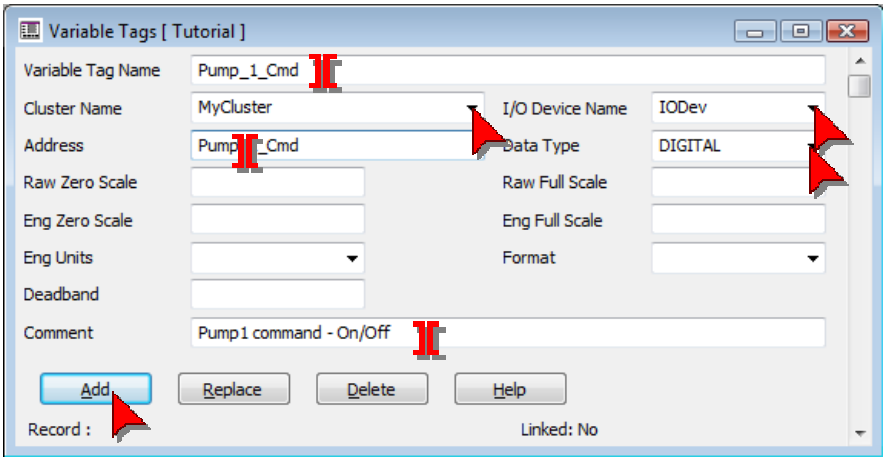
You can save a lot of time configuring tags by entering similar types of Tags together and just changing the parts that are different before pressing **Add**.

Use the mouse to highlight the parts that you want to change, then just overtyp. Eg; Pump_1_CMD can easily be changed to Pump_1_Mode. Highlight CMD then type Mode.

Next you will configure three tags as shown below. Remember to fill in the form before pressing Add or Enter. Use the Tab key or the mouse to move between fields.

To make corrections after you have pressed add, you can move to the Tag or record by using the scroll bars on the right-hand side, then press Replace when you have made the changes.

The cursors have been added as a guide to show you where you should type and where you should click.



For address based protocols, if you arrange your variables in your PLC into blocks where all the Digitals are contiguous and all the Integers are contiguous then the performance will be significantly improved as the CitectSCADA software will be able to read large blocks of data in a single communication message instead of multiple messages.

TIP
It does not matter what order the addresses are entered into the variables records, what matters is the contiguous block of addresses in the PLC.

If you are having difficulty reading from the screen grabs here is the information in plain format.

	Pump_1_CMD	Data Type	DIGITAL
I/O Device Name	IODEV	Address	Pump_1_CMD
Raw Zero Scale		Raw Full Scale	
Eng Zero Scale		Eng Full Scale	
Eng Units		Format	
Comment	Pump 1 Command – On/Off		

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Configuring Tags continued...



CitectSCADA automatically saves your configuration to disk each time you add, replace or delete a record.

Graphics behave differently where you must save your pages as you develop them.

TIP
Engineering Units which are not included with CitectSCADA's default pull-down list can be typed in manually. Any text can be entered as engineering units.

Variable Tag Name	Pump_1_Mode	Data Type	DIGITAL
I/O Device Name	IODev	Address	Pump_1_Mode
Raw Zero Scale		Raw Full Scale	
Eng Zero Scale		Eng Full Scale	
Eng Units		Format	
Comment	Pump 1 Mode – 0 =Auto, 1 = Manual		

TIP
CitectSCADA comes with Add-Ins for MS Excel which allow you to edit tags and other items in a spreadsheet.

When using this tool it is **critical** that you do not change the width of any columns.

Variable Tag Name	Pump_1_Speed	Data Type	INT
I/O Device Name	IODev	Address	Pump_1_Speed
Raw Zero Scale	0	Raw Full Scale	32767
Eng Zero Scale	0	Eng Full Scale	500.0
Eng Units	RPM	Format	###.# EU
Comment	Pump 1 Speed (0 – 500 rpm)		

NOTE: For the Format field, "EU" needs to be typed up after ###.#

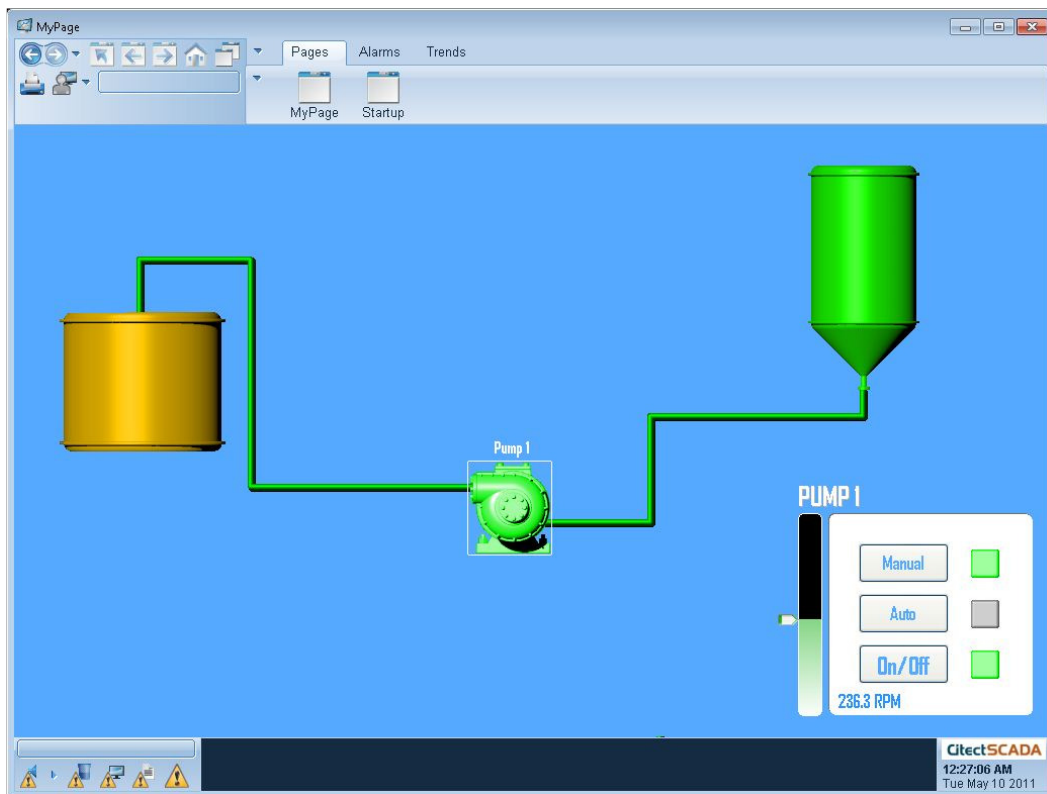
When you are finished, use the scroll bar on the right to scroll through each tag (record) and double check that you have entered the correct information. On the last tag, check that the number of tags (records) = 3.

Close the Variable Tags window by clicking on the or pressing ESC.

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Creating Graphic Pages

Before you start let's take a look at what you will create.



This page contains a number of buttons that allow the operator to control the pump's mode and operation, as well as a slider to control its speed.

The pump itself will animate red or green to show whether it is running, and the lights, bar graph and number will indicate its mode, operation and speed.

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The fastest way to drive any application is with the keyboard. Most programs have shortcut keys – you may be surprised how quickly you can learn them.

Templates provide a vast range of pre-built functionality, making the task of building a new project with CitectSCADA extremely fast.

All pages must be based on a template, even if it is a blank template.


If you want to customize the look and feel of your pages, you can create your own templates from scratch, or copy the existing ones and modify them.

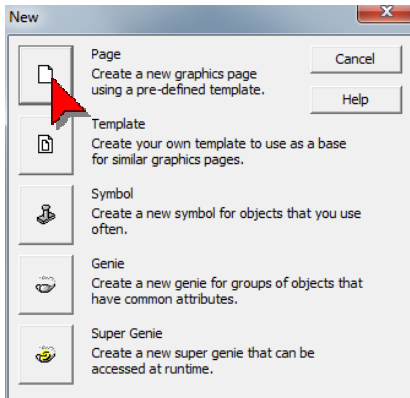
NOTE

Never modify templates, symbols or other items in the Example, Include or CSV_Include projects! These projects will be automatically re-loaded when you upgrade to the next version and your changes will be lost. Always copy items to your local project before modifying them.

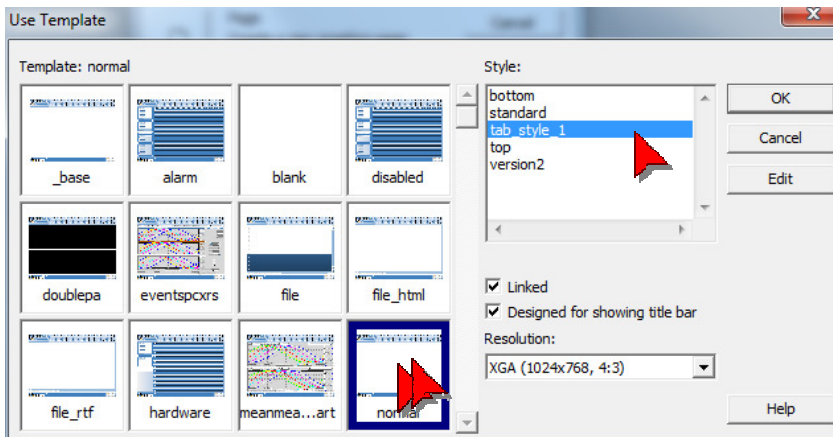
Creating Graphic Pages, Creating a new page

Switch to the Graphics Builder – click on the Graphics Builder icon .

Click on the New Page  icon. A popup form will appear allowing you to select what type of new graphics object you would like to create.



Click on the Page button. An additional popup form will appear allowing you to select a base template from which to create your new page.



Instead of double clicking on Normal we could single click on Normal and then click OK – but that takes more time.

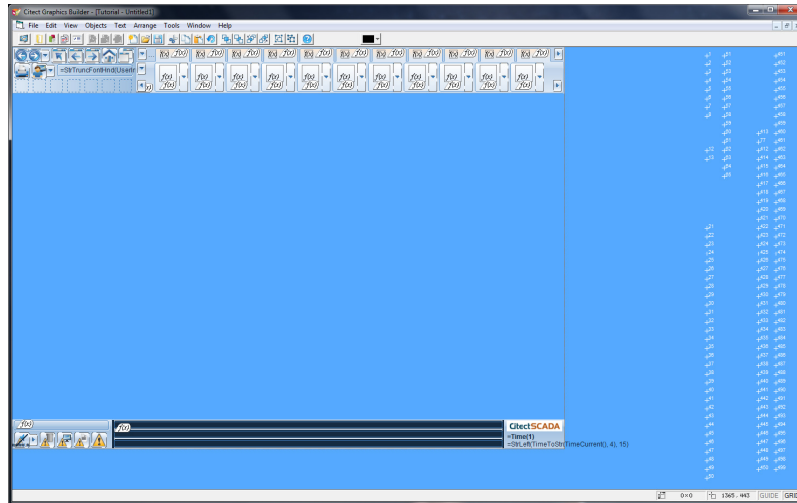
Make sure **tab_style_1** is selected in the Style box, then double click the Normal template as shown.

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Creating Graphic Pages, Saving your page

We are using the built-in templates to get a jump-start on your page. There are navigation buttons already configured for you and using templates helps to ensure a consistent look and feel throughout your project. This is very important if you want to make it easy-to-use for your operators.



Templates are displayed pretty much as they appear at runtime.

###.## indicates dynamic values that will change at runtime.


+1, +2 etc are Animation Numbers that are used as references for graphics objects that will be displayed at these locations in runtime. Animation Numbers are not displayed at runtime.

f(x) is a script that is executed with the page.

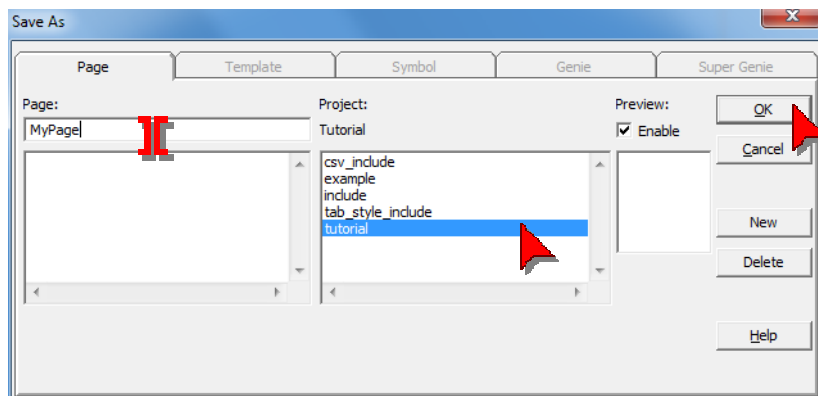


If your toolbox does not appear, it can be toggled by pressing the F3 button, or selecting it from the View menu.

It is good practice to save your graphic pages regularly, so let's begin the habit right now.

Click on the Save icon on the menu bar .

Type "MyPage" in the Page edit box, then press OK.



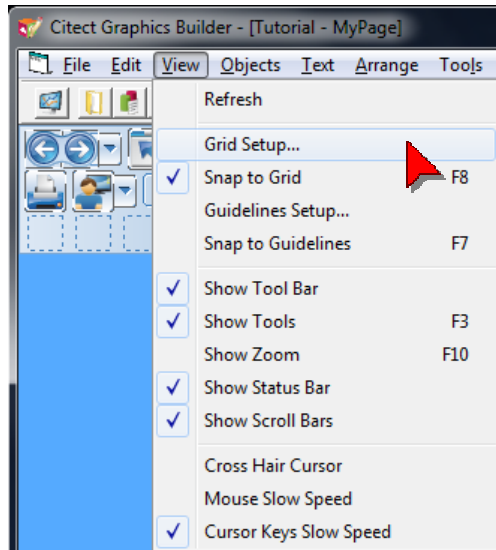
Quickstart Tutorial V7.20



Creating Graphic Pages, setting up the Grid

Firstly we will setup a grid which will allow our cursor to snap to uniformly positioned locations on the screen, making it easier to size and position objects in relation to each other.

On the toolbar, click View, then Grid Setup.

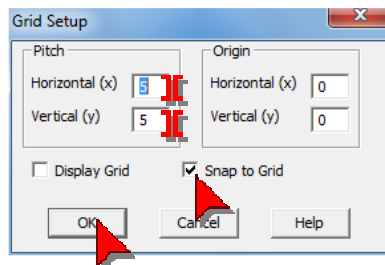


The Grid is not a necessary item for configuring graphics pages, however it vastly increases the ability to create uniform sized and positioned objects, which in turn makes your pages easier to visualize.

If the Grid prevents you from positioning an object exactly where you want it, it can be toggled on and off using the F8 key.

Another useful tool for positioning objects is the Align utility, located under the Arrange menu.

In the Grid Setup form, change the size of the grid from 8 x 8 pixels, to 5 x 5 pixels as shown below. Select Snap to Grid, and then click OK to close the form.



Now we are ready to create and position our graphics objects.

Quickstart Tutorial V7.20

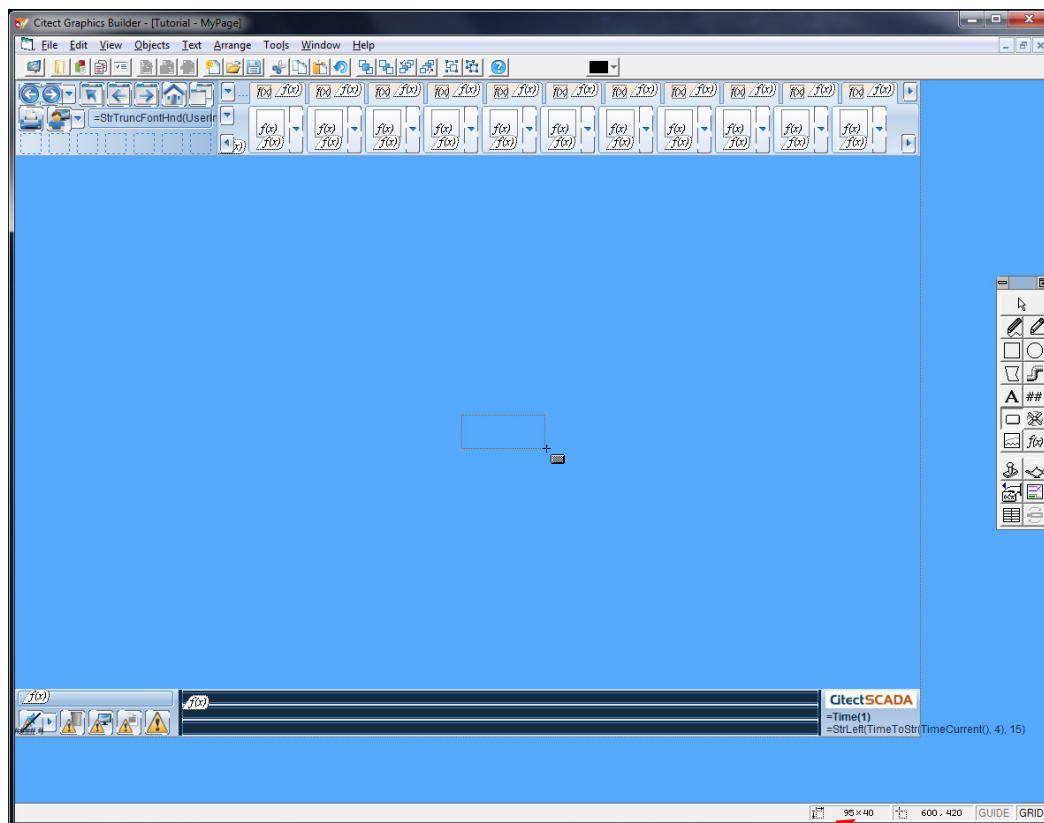
Creating Graphic Pages, Configuring Buttons

Next we will configure some buttons to control the mode of the pump.

On the Toolbox click on the button icon.



To draw the button, click and hold the left mouse button while moving the mouse then release the left mouse button (ie. click and drag the mouse).



The position and size of the currently selected object are shown at the bottom right of the graphics builder status bar.



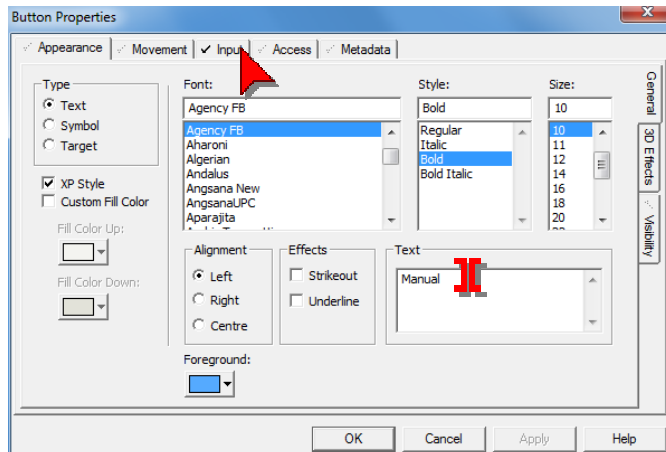
The Toolbox options are, from left-to-right and top-to-bottom:

- Free-form line
 - Straight line
 - Square/Rectangle
 - Circle/Oval
 - Polygon
 - Pipe
 - Text
 - Number
 - Button
 - Animated symbol
 - Trend (classic)
 - Function
 - Static symbol
 - Genie
 - ActiveX
 - Process Analyst
 - Database
 - Exchange
 - Pelco camera
 - viewer control

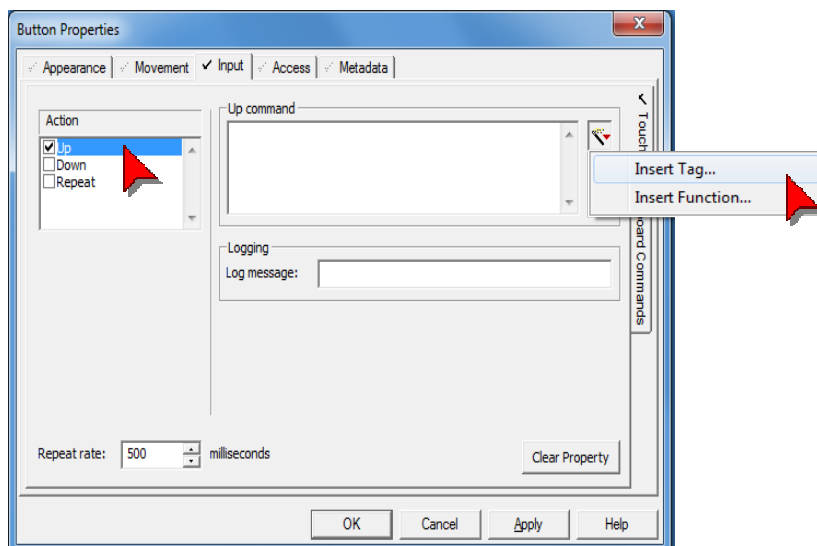
Quickstart Tutorial V7.20

Creating Graphic Pages, Configuring Buttons continued...

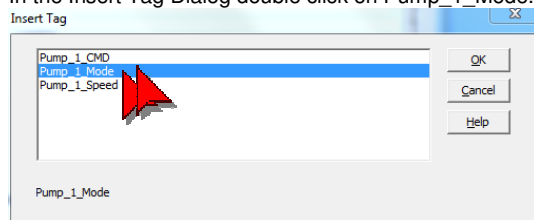
Once you release the mouse button, the Button Properties dialog popup will appear. Double click on the word button in the Text edit box. This is a quick way to select a complete word. Next type "Manual". Modify the font, style, size and color to suit your preferences.



Click on the Input tab at the top of the form to configure the action the button will perform.
Click on the Insert button.
Click on Insert Tag option.

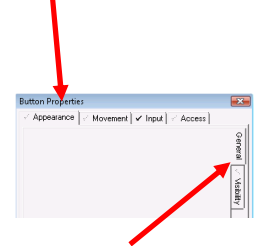


In the Insert Tag Dialog double click on Pump_1_Mode.



If you don't see the expected property sheet as you go through these exercises, then you may need to locate the correct sheet by looking at the screens on the page then click on the horizontal & vertical tabs to find the right sheet.

Horizontal Tabs



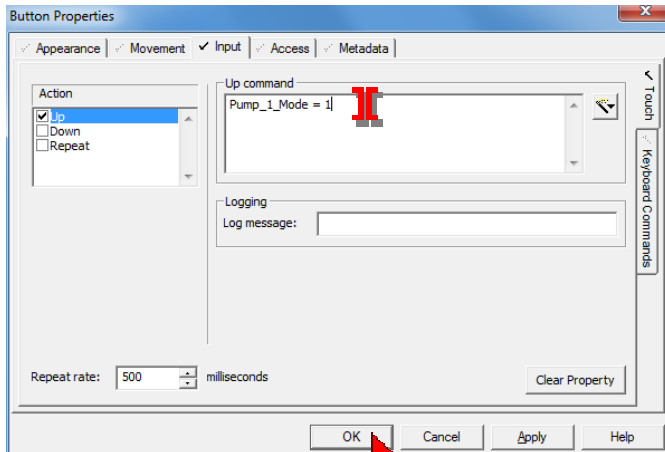
Vertical Tabs

TIP
Tabs with ticks on them indicate that configuration exists on that tab

Quickstart Tutorial V7.20

Creating Graphic Pages, Configuring Buttons continued...

Pump_1_Mode will be inserted into the Up Command edit box. Click your mouse to the right of the Tag Pump_1_Mode and type "= 1".



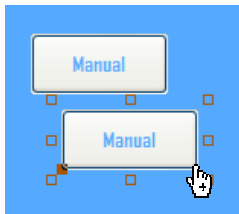
When the project is running, pressing on the Manual Button will set the tag Pump_1_Mode to a value of "1" to represent "Manual" mode. Repeated pressing of the button will continue to set the same value of "1" into the tag. Therefore we need a second button to set the tag to a value of "0" or "Auto" mode.

We will achieve this by copying the first button and modifying the copy. We do this because it is often quicker to make copies of objects than to draw them from scratch. This also guarantees consistency of object sizes.

Here is a quick way to make a copy and position an object.

- Place the cursor over the Manual Button.
- Hold down the Ctrl key.
- Hold down the left mouse button.
- Move the mouse to position the copy.
- Release the left mouse button.

You don't need to be precise with position at this time – we will fix that later using an alignment tool.



If you move the mouse immediately after holding down left mouse button, then you will only see the outline of the object as it is moved.

If you wait half a second before moving the mouse, you will see the object itself being moved, making it easier to position it in its new location.

The + sign will appear on the hand after pressing the Ctrl Key indicating a copy operation rather than a move operation.



There are many ways to copy objects.

Ctrl + D will duplicate the currently selected object.

Ctrl + C will copy an object to clipboard.

Ctrl + V will paste an object from clipboard.

These last two work in almost all windows programs so are well worth remembering.

You can also select Copy, Paste or Duplicate from the Edit menu or by using the icons on the menu bar.

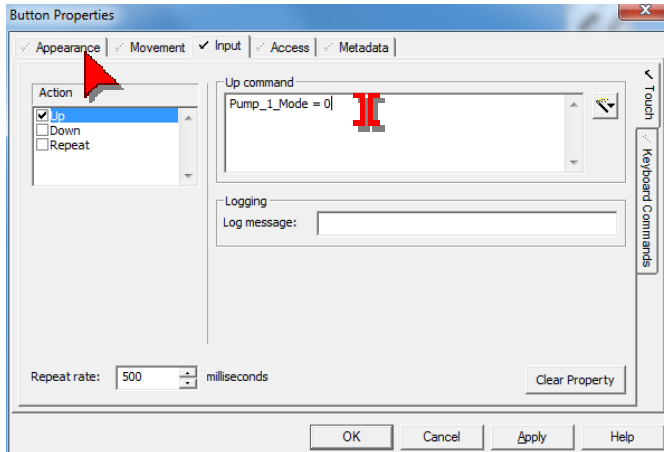
Copying objects also ensures that their dimensions are identical to each other, creating a more visually appealing user interface.

Quickstart Tutorial V7.20

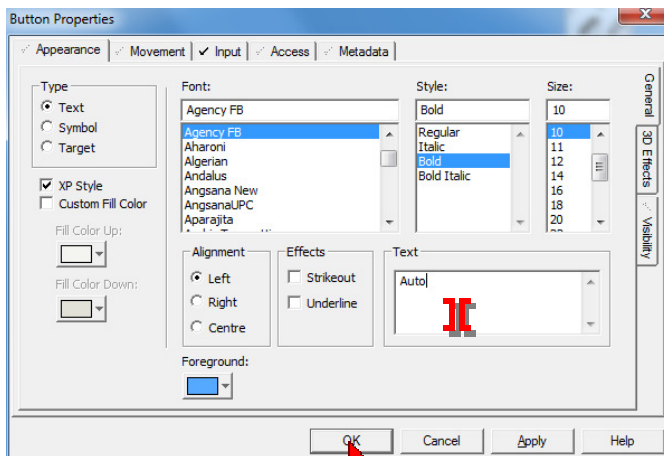
Creating Graphic Pages, Configuring Buttons continued...

Double click on the new button.

In the Up Command edit box, replace the = 1 with a = 0. This will turn the digital tag Pump_1_Mode false to represent Auto mode.



Click on the Appearance Tab to change the text label on the button.



Double click on the word Manual in the Text edit box, replace the text with Auto.
Click OK when finished.

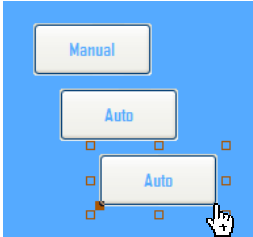
We now have two buttons that will set the control mode of the pump to Auto or Manual. Next we need a control to turn the pump on and off. Instead of using two buttons, one for on and another for off, this time we'll use just one button.

Quickstart Tutorial V7.20



Creating Graphic Pages, Configuring Buttons continued...

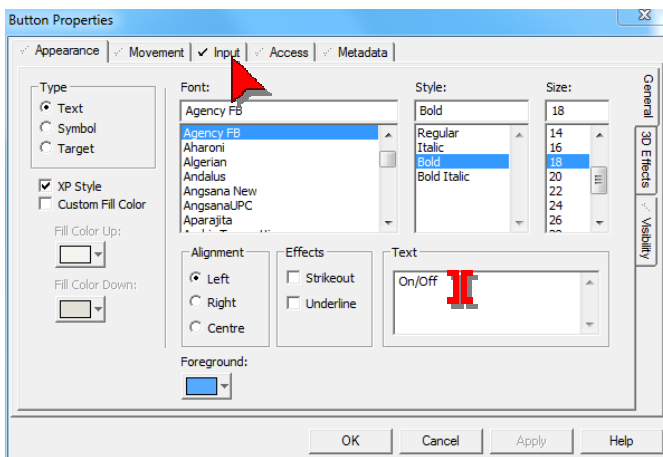
Make a copy of the Auto Button (hold the Ctrl key, then click and drag the Auto Button to create a copy in a new location).



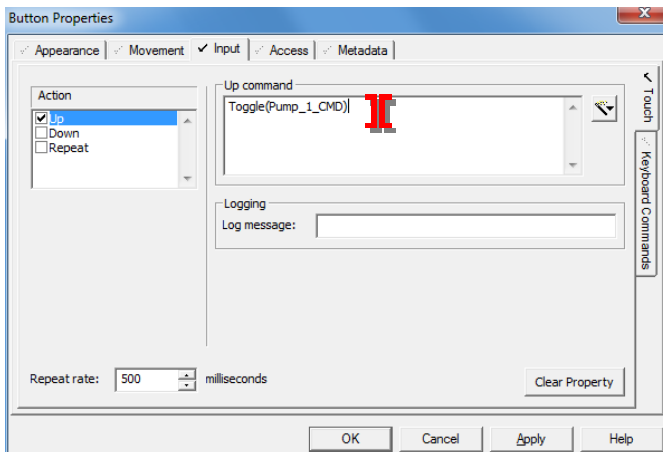
You can also use the reserved word TRUE instead of a 1, and FALSE instead of a 0.

TRUE and FALSE are not case sensitive, but upper-case is a common convention used to indicate a reserved word.

Double click the new button to access its animation properties, then change the button Text to read "On/Off". Click on the Input tab when finished.



In the Up Command edit box replace the current text with Toggle(Pump_1_CMD).



Quickstart Tutorial V7.20

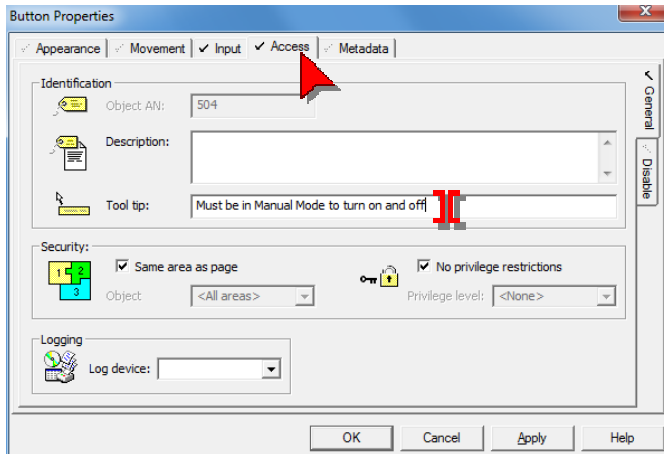
Creating Graphic Pages, Configuring Buttons continued...



We will now inhibit the Manual On/Off button from working while the pump is in Auto mode and we'll add a tool tip on the way to explain this to operators.

Click on the Access Tab at the top of the button form. In the Tool tip edit box type "Must be in Manual Mode to turn on and off" then click the Disable tab (on the vertical tabs).

Under the access tab you may notice there is a section called security. This is a very powerful feature in CitectSCADA that allows you to precisely define who can access what. Configuring security is covered in the CitectSCADA Configuration training course.

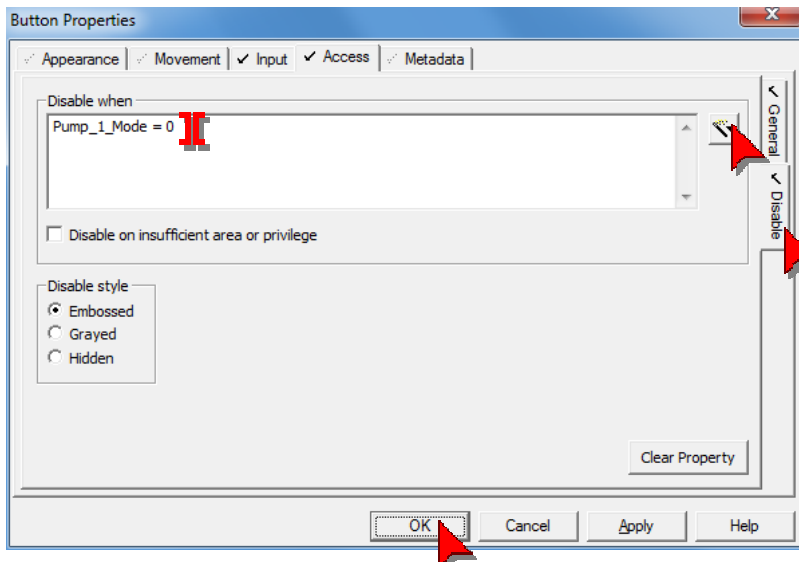


Click on the Insert icon

Click Insert Tag.

Double click on Pump_1_Mode and Add the text = 0 after the tag.

Leave the disabled style as Embossed.



Click OK when you're finished.

When Pump_1_Mode is "0" or FALSE (i.e. in Auto) this button will be disabled. The button's appearance will be altered using the Embossed style to indicate that it is disabled and it will not highlight when the cursor moves over it. The tool tip will still work normally.

Quickstart Tutorial V7.20

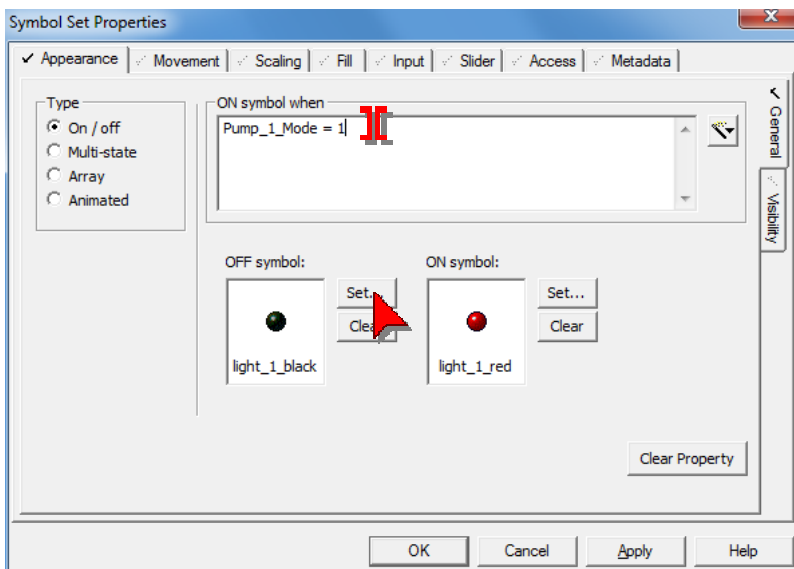
Creating Graphic Pages, Configuring Symbol Sets

Our control buttons for our pump are now complete. We will now add symbol indicators to show what state the pump is in. These indicator lights will show whether the pump is on or off, and whether it is in auto or manual mode.

On the Toolbox click on the Symbol Set Tool.



Position the cursor next to the Manual button, then click to place the symbol on the page. In the ON symbol edit box type "Pump_1_Mode = 1".



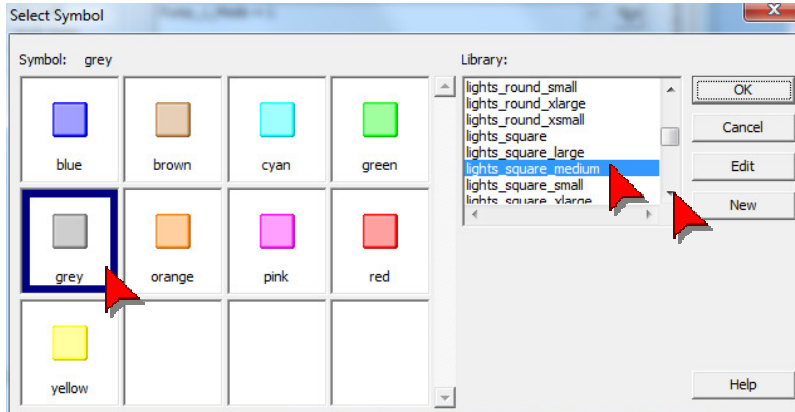
Click on the OFF symbol Set... button to select a different symbol to display for this state. A new popup form will be displayed, with a list of symbol libraries to the right, and thumbnails of the symbols within the selected library on the left.

Scroll down the libraries until you find the Lights_square_medium library, then click on it to select it. The thumbnails on the left will change.

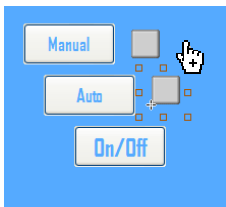
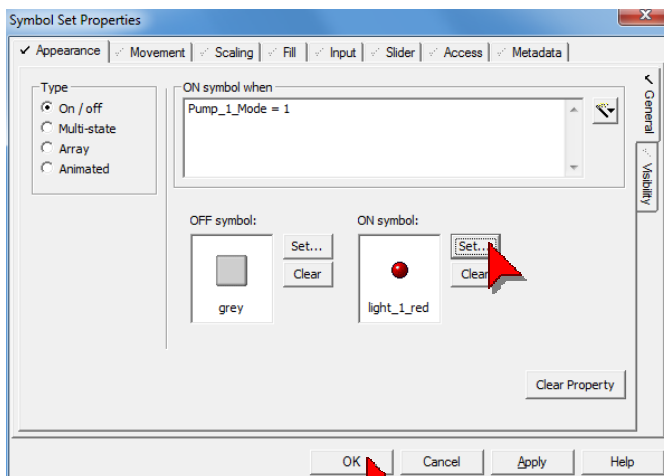
Quickstart Tutorial V7.20

Creating Graphic Pages, Configuring Symbol Sets continued...

Select the Grey light by Double clicking on it. This will replace the original black light with a new grey light for the off state of the animation.



Repeat this exercise for the ON symbol state, this time selecting the green light from the lights round library. Click OK when your configuration of the manual symbol is complete.



Copy the Symbol Set and place the new one next to the Auto button. Again, don't worry about positioning the symbol perfectly as we will align the various objects shortly.

Double click the copied symbol to access its animation properties. In the ON symbol when edit box replace the expression with `Pump_1_Mode = 0` then click OK.

Quickstart Tutorial V7.20

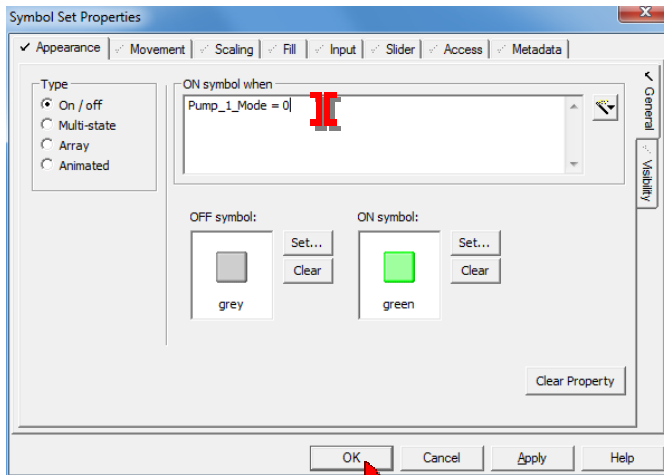
Creating Graphic Pages, Configuring Symbol Sets continued...



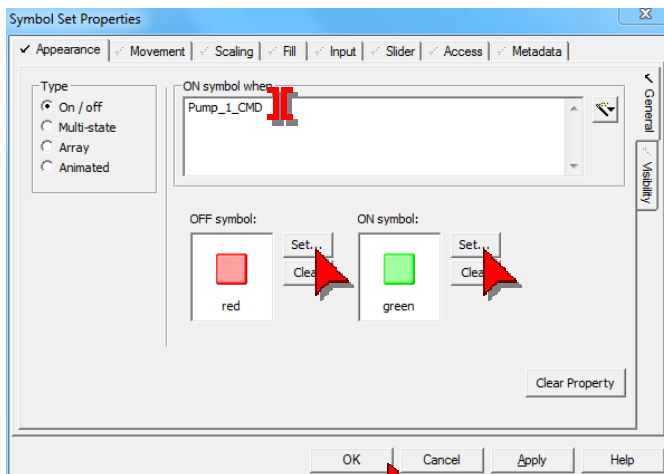
TIP

DIGITAL tag types do not require “=1” in their symbol detection logic because CitectSCADA knows that they only have two states corresponding to the two symbol states available.

This is a little different to when we were writing commands to the tag and we had to explicitly tell CitectSCADA which state to set the DIGITAL tag to.



Make a third copy of the symbol set and position it next to the On/Off button. In the On symbol when edit box replace the text with Pump_1_CMD. Click the OFF symbol Set... button and select the Red light from the lights round library, then select the Green light for the ON symbol.



At Runtime, when Pump_1_CMD is on (i.e. equals “1”) the Green Light will be displayed, and when it is off (i.e. equals “0”) the Red Light will be displayed.



TIP

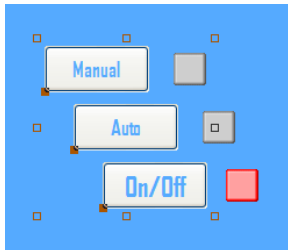
Another way to select multiple objects is to drag the cursor around them while holding the left mouse button down to "lasso" the objects. You will need to be careful not to select additional objects if you use this method.

Creating Graphic Pages, Aligning Objects

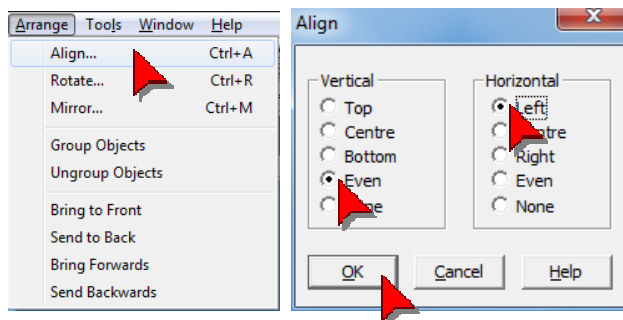
It is worthwhile making your pages look aesthetically pleasing as it will encourage operators to use the system and also makes it faster to find information on the screen. Making sure everything is drawn precisely, aligned correctly and evenly spaced also helps to make your pages look professional.

You can align objects manually by dragging them around the screen until you have positioned them satisfactorily, and for which the Grid is an excellent assistant, however sometimes we want to align a group of objects quickly relative to each other. For this we use the Align tool.

Select all three buttons by clicking on each of them, while holding the CTRL key down for the last two. All three buttons should have a selection indication at their button left, and be bounded by a large transparent rectangle identified by the four corners, and four center points as shown below.



From the Graphics Builder toolbar, select Arrange, and then Align. An alignment popup form will appear, asking you how you would like to arrange the selected objects. Select Left for the horizontal alignment and Even for the vertical alignment, then click OK.



Repeat this exercise for the lights to the right of the buttons. Try selecting a button and a light and aligning them vertically via the Centre selection before aligning all three lights evenly. Keep going until you are satisfied with the arrangement of the objects on your screen.

Quickstart Tutorial V7.20

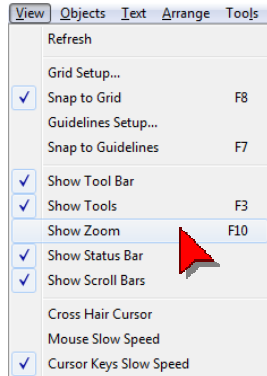


TIP
The Zoom tool can be quickly toggled on and off using the F10 key

Creating Graphic Pages, Aligning Objects continued...

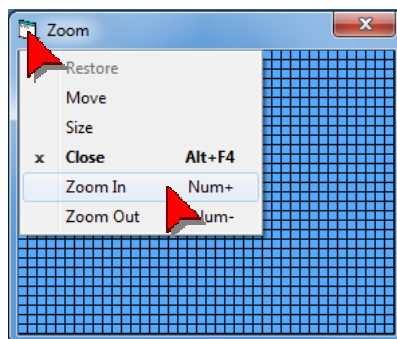
You may notice that the lights are not perfectly in line with the center line of the buttons. This is because the hot spot or anchor point for this symbol is in the top left of the symbol rather than in the middle. To correct for this we will use the zoom and the nudge tools.

To make sure your objects are aligned or positioned perfectly you can use the Zoom tool. From the Menu select View, Show Zoom.

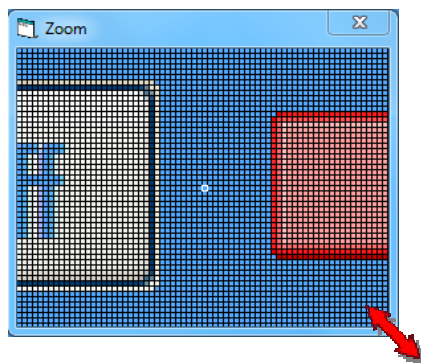


The zoom tool will display an enlarged view of the region around your cursor. You can alter the "magnification" by clicking in the top left corner of the zoom window

You can move the zoom window by placing the cursor on the title bar (the big blue bar at the top) then hold down the left mouse button and move the mouse.



You can change the magnification of the zoom by clicking on the pop-up's window icon, and selecting to Zoom In or Zoom Out as required.



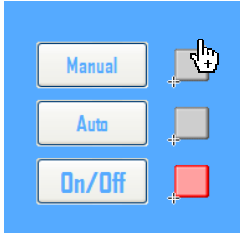
You can change the size of the zoom window by placing the cursor over one corner until the resize cursor is shown, then hold down the left mouse button and move the mouse.

Quickstart Tutorial V7.20

Creating Graphic Pages, Aligning Objects continued...

Since the lights are in the correct position relative to each other, we will select all the lights so that we can move them together as a group. Place cursor above and to left of top button; hold down left mouse button and move mouse, then release mouse button to lasso all three buttons.

If you have the Grid tool turned on, press F8 to disable the Snap to Grid function, otherwise the buttons will only move to the nearest grid position.



You can now precisely position the lights by placing the cursor over the selected objects (make sure the hand cursor appears) then press Enter (or hold down left mouse button), next use the arrow keys on the keyboard to move the buttons one pixel at a time in the direction that you want. Use the zoom box to see exactly where the objects are positioned to the nearest pixel. Press enter again to set the position (or release left mouse button if you used that method).



TIP

Windows XP style buttons have a grey border around the button. If you do not want a grey background for your buttons it is suggested that you uncheck the XP Style option under the Appearances tab of your buttons.

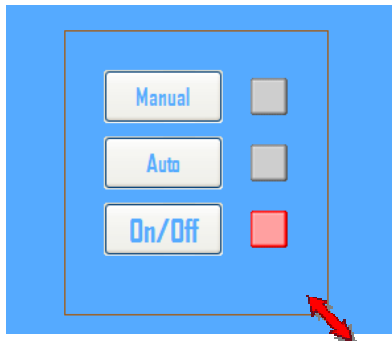
Save your page.

Creating Graphic Pages, Formatting with Rectangles

Next we will create an area to highlight our control panel.

Press F8 to turn the Snap to Grid selection back on. On the Toolbox click on the Rectangle Tool.

Click and drag to place a rectangle around your buttons and lights.



Once the rectangle is positioned, you can easily resize it by clicking and dragging the bounding boxes in each corner, and the center of each side.

Quickstart Tutorial V7.20

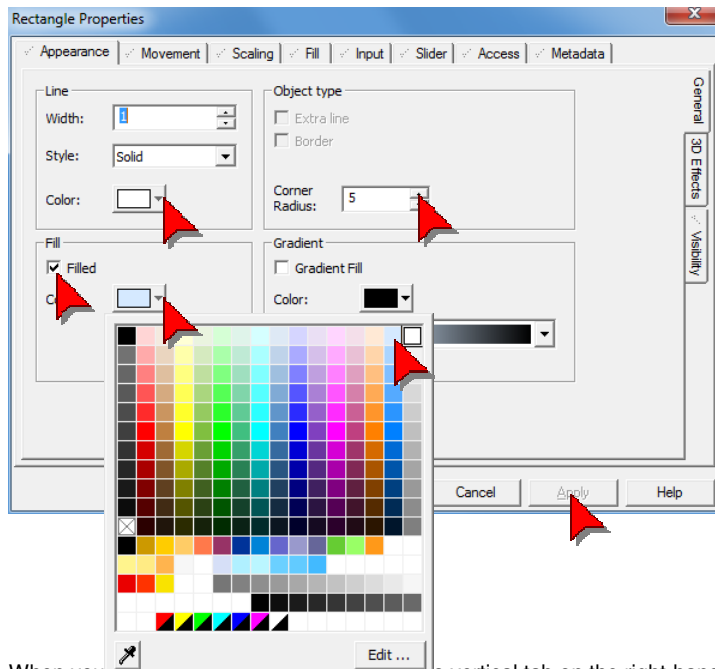


Creating Graphic Pages, Formatting with Rectangles continued...

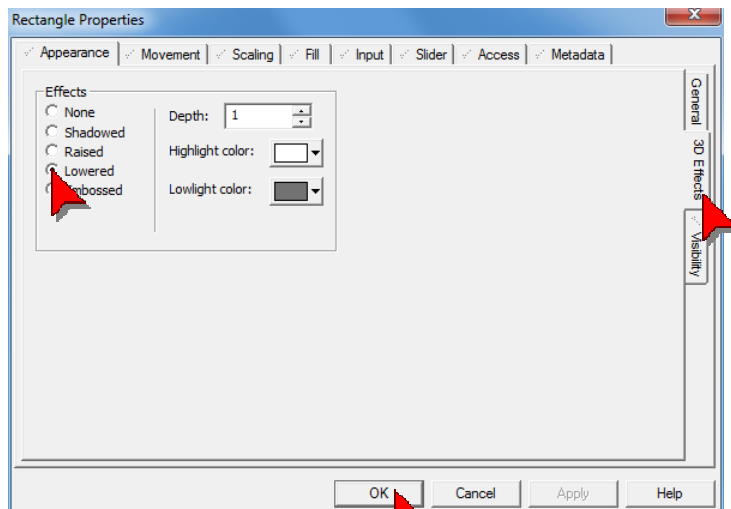
When the Rectangle Properties dialog popup appears, change the Style to Solid, the Corner Radius to 4, the Line Color to a Pale Grey, tick Filled, and set the Fill Color to pale blue as shown below.

TIP
Once a shape has been created you can click and drag the node points (1 per corner and 1 per side), to modify its size and shape.

TIP
Holding the Ctrl key down while sizing a rectangle or oval forces the object to have the same vertical and horizontal dimensions. This allows you to easily create squares and circles respectively, rather than rectangles and ovals.



When you click on the 'General' tab, the '3D Effects' tab is selected on the right-hand side of the form.




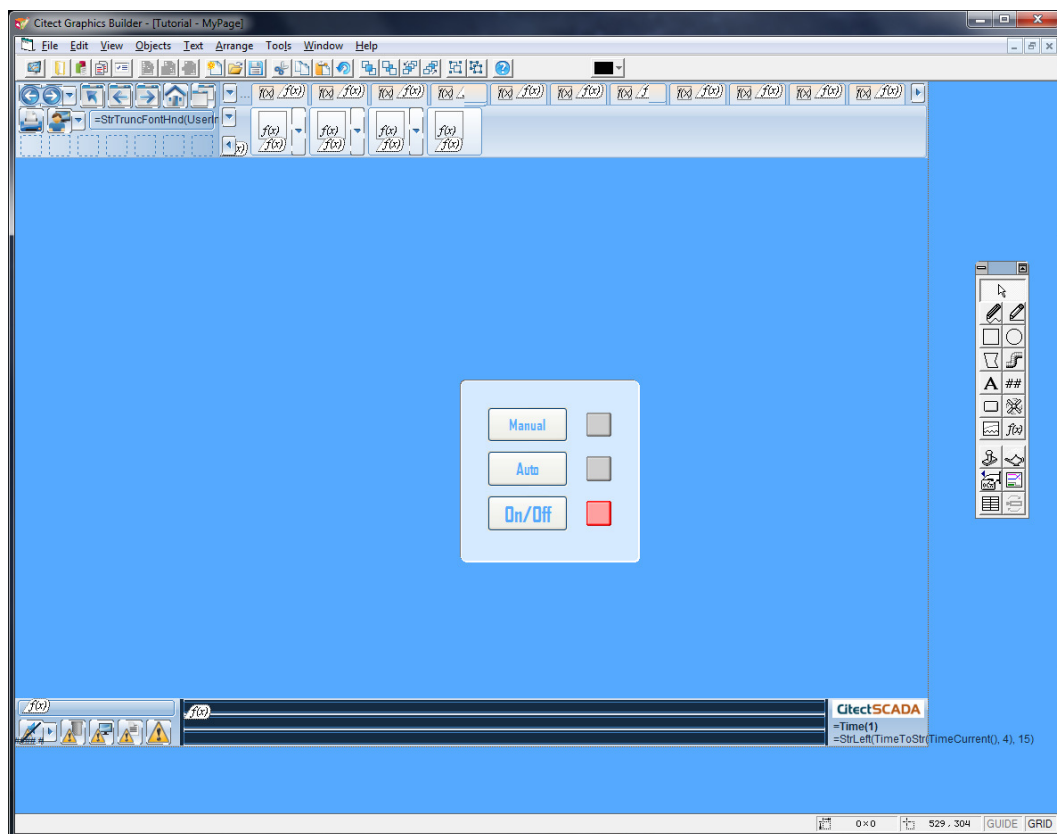
Select Lowered from the various 3D Effects available, and retain the default depth and color options, then click OK.

Quickstart Tutorial V7.20

Creating Graphic Pages, Formatting with Rectangles continued...

The rectangle should now cover all of your buttons and lights, obscuring them from view. We need to send the rectangle to the back to allow the buttons and lights to appear in front of it.

Select the rectangle by clicking on it, then click the Send-to-Back button  or alternatively select Arrange, then Send to Back from the menu bar.



Your page should now look similar to the above. Save your page.

Quickstart Tutorial V7.20

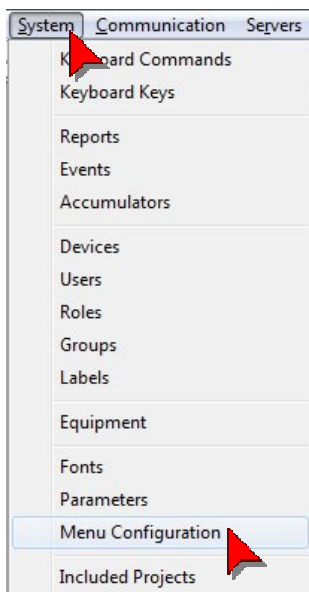
Configuring Menu Items

We are almost ready to run our project and test it. Before we can do so we need to create a navigation mechanism to allow us to display the page (and other pages) at runtime. We will build a navigation menu now.

When you create a new starter project, Citect adds the following commonly used pages to your project for you:

- | | |
|-------------------------|--|
| • Startup | This is the splash page that loads first when you run your project |
| • Active Alarms | A page that lists active alarms and provides controls for managing them |
| • Alarm Summary | A page that lists all the alarms and provides controls for managing them |
| • Disabled Alarms | A page that shows the alarms that's been disabled by the user |
| • Hardware Alarms | A page that provides a list of alarms related to hardware and equipment |
| • Process Analyst | A page that uses trend tools to monitor and chart tags and alarms |
| • Popup Process Analyst | A popup window containing the Process Analyst |

If your project does not have any menu items configured, the runtime will automatically create a dynamic navigation menu. Menu items can be defined within the project to allow for custom navigation tailored to your project requirements. We will add menu items in the menu configuration utility to enable access those pages using the navigation toolbar.



On the Project Editor menu select System.

Choose Menu Configuration.

There are a few things to note on the Menu Configuration form: Menu Configuration allows you to create a menu hierarchy up to 4 levels deep. For our project we only need 2 levels as you will see on the next page. Here is a list of top level menu items (Level 1):

- Pages We will place our graphics pages under Pages menu item
- Alarms Alarm related pages will be place under Alarms menu item
- Trends Anything related to monitoring tags and process information will be placed here

Level 2 menu items correspond to individual items under each level 1 item. Each level 2 menu item that has the same level 1 menu name will be grouped together. Here is a list for our level 2 menu items:

- Pages
 - MyPage
 - Startup
- Alarms
 - Active Alarms
 - Alarm Summary
 - Disabled Alarms
 - Hardware Alarms
- Trends
 - Process Analyst
 - Popup Process Analyst

Quickstart Tutorial V7.20

Configuring Menu Items continued...

Firstly, fill in the details as shown below to create your first menu item to access MyPage. Note that if you wish your items to be displayed in a particular order simply add the ordering number inside the Order textbox, otherwise leave it empty.

Menu Configuration [Tutorial]

Order:

Level 1: Pages

Level 2: MyPage

Level 3:

Level 4:

Menu Command: PageDisplay("MyPage")

Symbol: icons_32x32.page

Comment:

Buttons: Add, Replace, Delete, Help

Record: 1

The Menu command field is used to run a Cicode function when the menu item is selected by the user in runtime. Type in PageDisplay("MyPage") to tell Citect to switch the display to the MyPage display which you have just created.

Citect comes with a library of icons. For now, just remember that the format for Symbols is

<Library name>.<Symbol name>

Here we simply tell Citect to use the page symbol from the icons_32x32 library to be displayed as the icon for our MyPage item. Note that the Symbol field is optional and does not have to be used.

Once you have filled in those details, click Add.

Next, define a new menu item for Startup page by simply changing the level 2 item to Startup. Also change the parameter inside the PageDisplay function to Startup.

Click Add.

Menu Configuration [Tutorial]

Order:

Level 1: Pages

Level 2: Startup

Level 3:

Level 4:

Menu Command: PageDisplay("Startup")

Symbol: icons_32x32.page

Comment:

Buttons: Add, Replace, Delete, Help

Record: 1 End of file

Quickstart Tutorial V7.20

Configuring Menu Items continued...

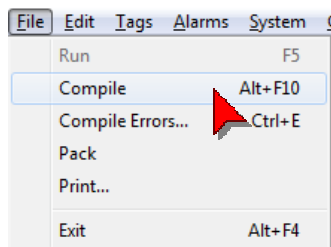
Repeat the above steps to add the remaining navigation items using the information from the table below:


Menu Item	Level 1	Level 2	Menu Command	Symbol
1	Pages	MyPage	PageDisplay("MyPage")	icons_32x32.page
2	Pages	Startup	PageDisplay("Startup")	icons_32x32.page
3	Alarms	Active Alarms	PageDisplay("Alarm")	icons_32x32.alarm_act
4	Alarms	Alarm Summary	PageDisplay("Summary")	icons_32x32.alarm_sum
5	Alarms	Disabled Alarms	PageDisplay("Disabled")	icons_32x32.alarm_dis
6	Alarms	Hardware Alarms	PageDisplay("Hardware")	icons_32x32.alarm_hw
7	Trends	Process Analyst	PageDisplay("ProcessAnalyst")	icons_32x32.trend
8	Trends	Popup Process Analyst	WinNewAt("!ProcessAnalystPopup", 200, 200, 2)	icons_32x32.trend_popup

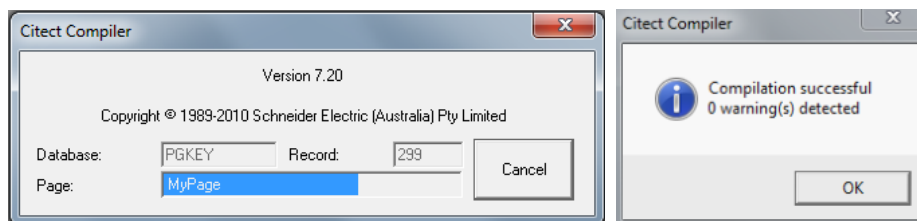
Testing Graphic Pages, Computer Setup Wizard

It's time to test your configuration and see how your page looks and feels to an operator. Firstly however, we need compile the project to make sure we have not made any configuration errors, and then we will run the CitectSCADA Computer Setup Wizard to configure how you want this computer to behave within your overall CitectSCADA network.

Switch to the Citect Project Editor using Alt+Tab. From the File menu, select Compile.



Alternatively you can use the compile button  on the menu bar. You should see a compilation progress bar, followed by a Compilation Success popup.



If your compilation fails, you can double-click on an error from the list provided to take you directly to the location of the incorrect configuration, or you can review your work using this document to ensure that you have performed all steps correctly.

Quickstart Tutorial V7.20

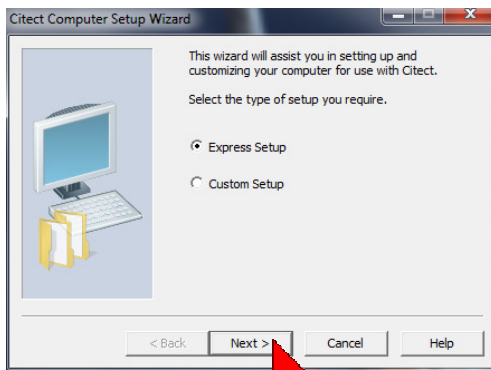
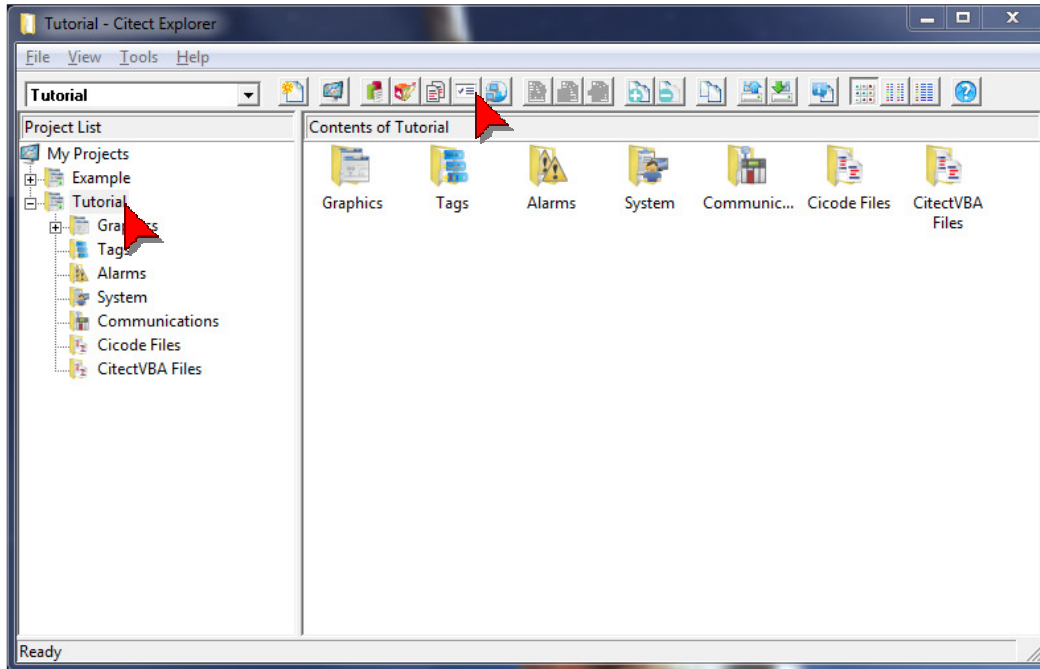
Testing Graphic Pages, Computer Setup Wizard continued...

We will now setup our Computer's role within the CitectSCADA network. Switch to Citect Explorer using Alt+Tab.

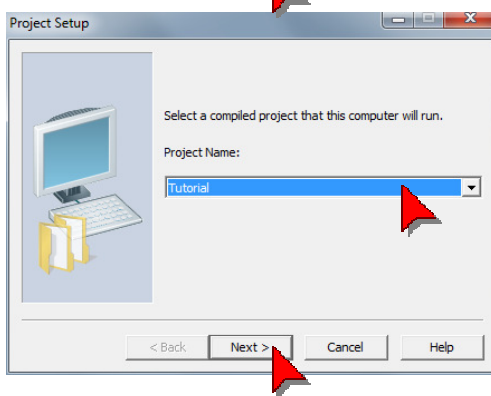
In the Project List tree make sure the Tutorial project is selected.
In the menu bar, click the Computer Setup button.



The Computer Setup Wizard is typically run only once per project for each computer on which CitectSCADA will run.



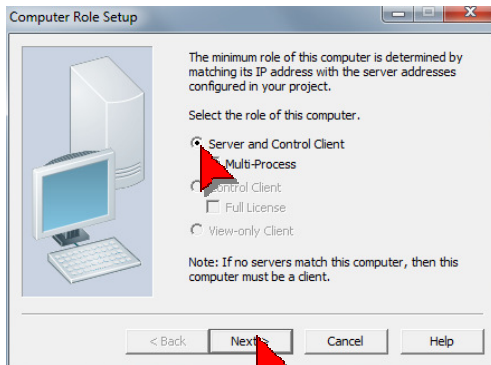
Check Express Setup then click Next.



Click the Project Name Drop Down and select Tutorial, then click Next.

Quickstart Tutorial V7.20

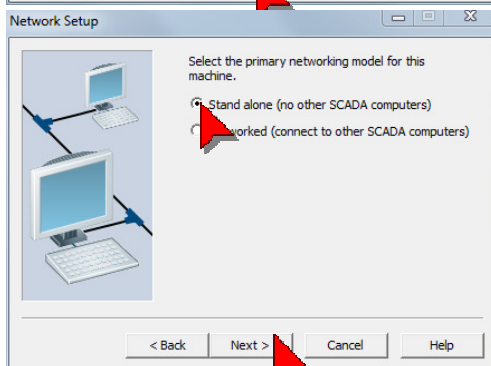
Testing Graphic Pages, Computer Setup Wizard continued...



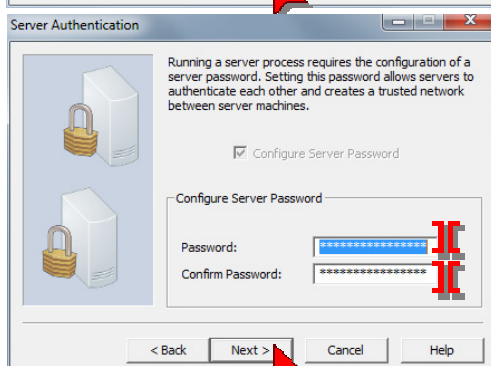
Check Server and Display Client, then click Next.

Multi-Processing is used to distribute server tasks across multiple CPUs.

Networking enables communications from this CitectSCADA node to other CitectSCADA nodes on the network. It cannot be used without a license key.



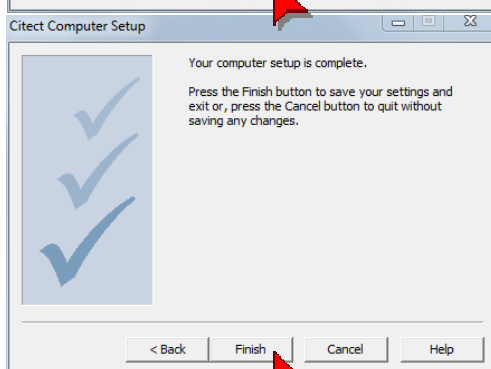
Change the networking selection from the default of Discovery to No Networking, and then click Next. This will isolate this CitectSCADA on the network to allow it to run as a Stand-alone system.



Type a server password of "citect" in both password boxes, then click Next.

TIP

New to V7.20 is the concept of a peer-to-peer security model for application level trusts. This prevents unauthorized Citect stations from connecting to the servers, helping to protect against potential malicious access.



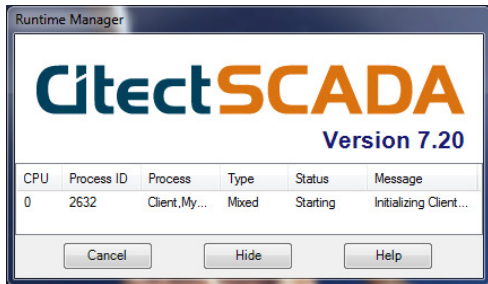
Click Finish.

We are now ready to run our project and test our controls.

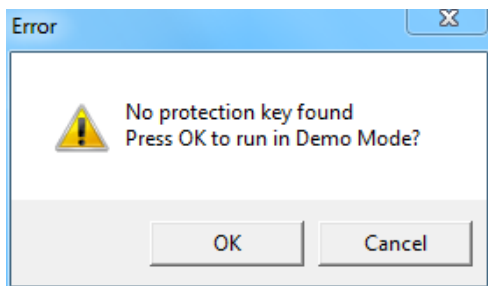
Quickstart Tutorial V7.20

Testing Graphic Pages, Runtime

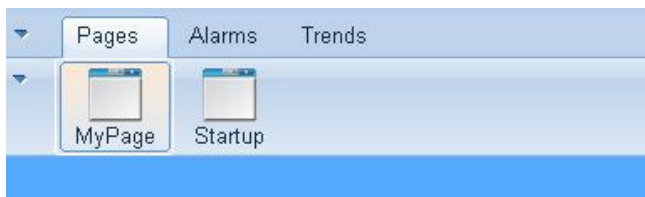
Press the Run  button. The Runtime Manager dialog will appear, showing the startup process and status.



If you have not inserted a protection key you will see the following message:



Click OK to run the project in demonstration mode.

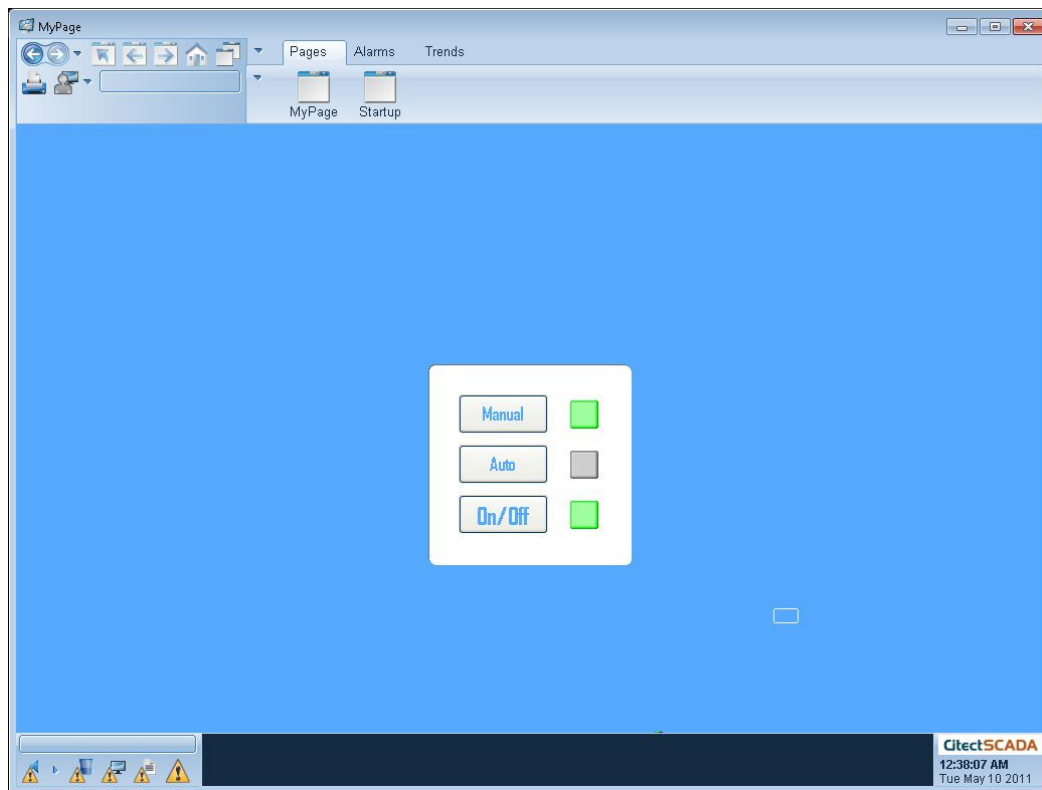


Initially a generic welcome page is displayed. You will notice your page is listed on the tabbed menu at the top of the menu bar. Click on MyPage now.

Your page will now display.

Quickstart Tutorial V7.20

Testing Graphic Pages, Runtime continued...



Click on the Manual button then the Auto button and check to see that the appropriate light activates. Also check that the On/Off button becomes unavailable for selection whilst in Auto mode.

Move the mouse over the On/Off button and wait a couple of seconds to see that the tool tip appears.

See what happens if you click on the On/Off button.

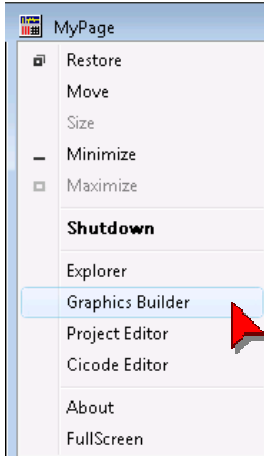
Click on Manual, and then try clicking on the On/Off button again.

If you've made it to this point, give yourself a gold star and take a moment to stretch your muscles.

Quickstart Tutorial V7.20

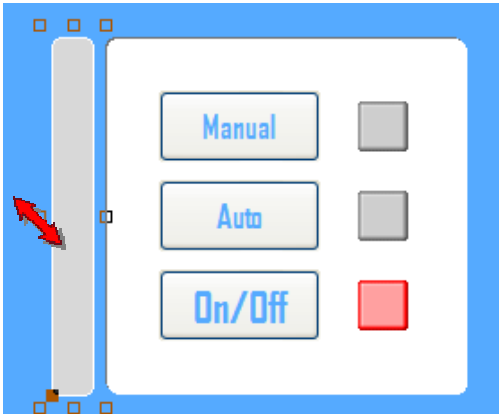
Creating Graphic Pages, Analog Indicators & Controls

To switch from runtime back to Graphics Builder, press Alt+Space together, then click on Graphics Builder. If it does not come to the foreground, click on the flashing application icon in the Windows bar.



Select the static rectangle you have already created and copy it by dragging it and holding the Ctrl key down on your keyboard (alternatively use standard windows copy and paste controls). Position it to the left of the existing rectangle and drag the resize nodes to change it to a tall, narrow rectangle as shown below.

Use the Zoom and nudge, Align, or Grid tool to precisely position the Rectangle in line with the existing rectangle.



Double-click the rectangle to access the rectangle properties form.

Select the Appearances tab on the horizontal tabs, and the General tab on the vertical tabs.

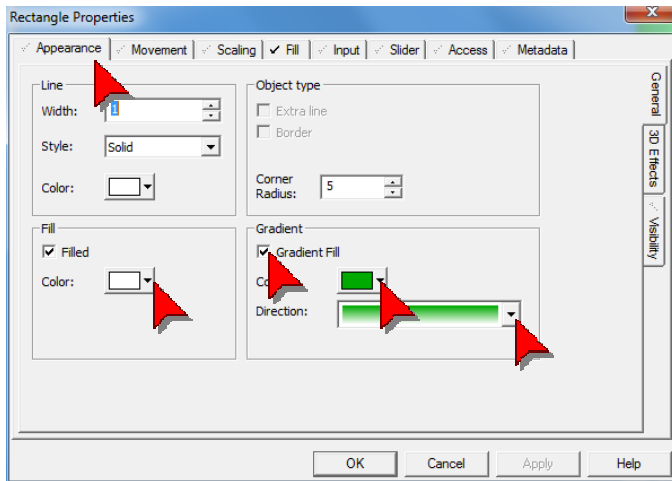
Change the Filled Color to white.

Check the Gradient Fill option and select bright green as the Gradient Color.

From the pull-down options, change the Gradient Direction to vertical.

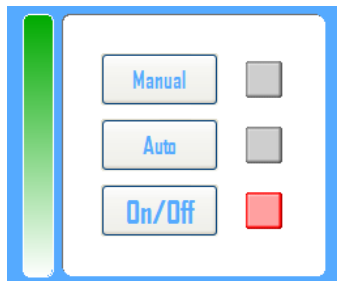
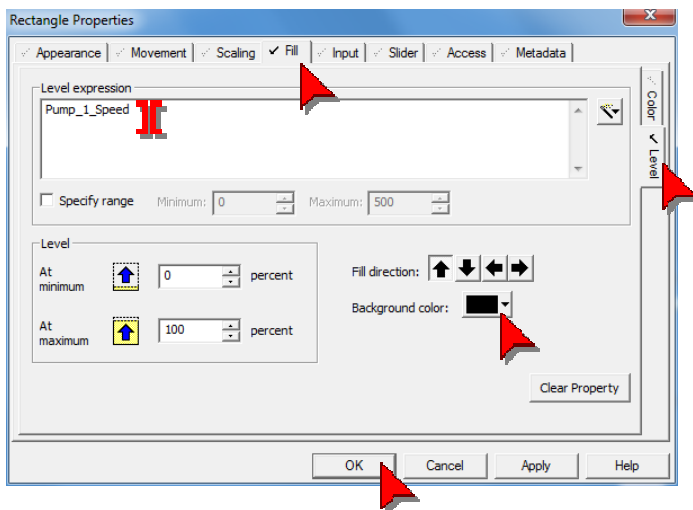
Quickstart Tutorial V7.20

Creating Graphic Pages, Analog Indicators & Controls continued...



Once finished configuring the rectangle's appearance, click on the **Fill** tab and select **Level** from the vertical tabs on the right-hand side of the form.

Use the **Insert** button to insert the tag **Pump_1_Speed**. Change the **Background Color** to black then click **OK**.



This rectangle will fill and change color as the pump speed increases. The range for the analogue value, 0 to 500 RPM, is automatically derived from its tag definition which we built earlier.

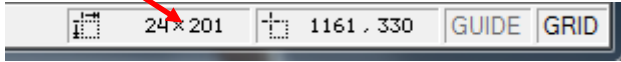
Next we will create a slider to allow operator control of the pump speed when it is in manual mode.

Quickstart Tutorial V7.20

Creating Graphic Pages, Analog Indicators & Controls continued...

You will need to know the how far (in pixels) the slider needs to move. To find this out select the gradient rectangle (bounding boxes will appear), and look at information provided in the status bar at the bottom right corner of the Graphics Builder.

This status bar will show you the width and height of the selected object. Write down the height of the rectangle.

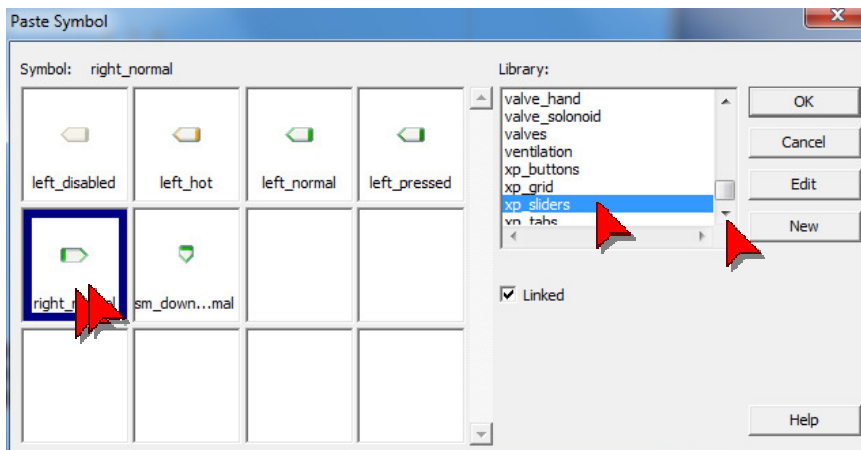


NOTE: If the status bar is not visible, go to the View menu on the menu bar and click on Show Status Bar.



On the Toolbox click on the Paste Symbol tool.

When the Symbol selection popup appears, use the scroll bars to locate the xp_sliders library and then click on it to select that library.



Double click on right_normal to place it on the page.

Quickstart Tutorial V7.20

Creating Graphic Pages, Analog Indicators & Controls continued...

Position the pointer at the left bottom side of the gradient rectangle using Zoom and Nudge or the Align tool.

Double click on the Pointer Symbol to open the Symbol Properties form.

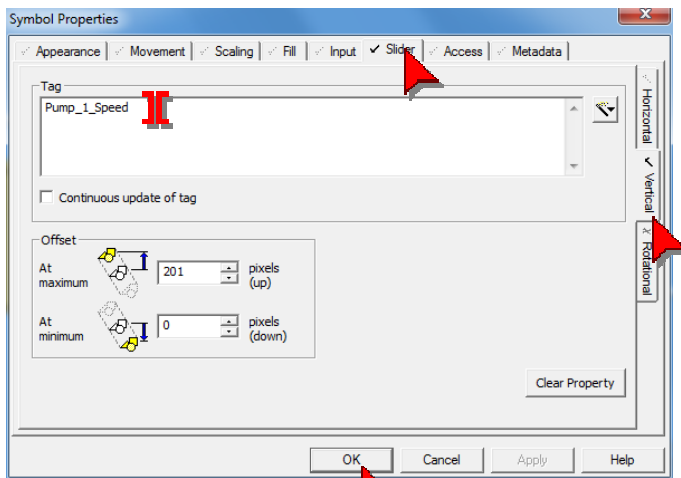
Click on the Slider Tab, then click on the Vertical Tab on the right-hand side. The most common mistake made in this tutorial is configuring a Horizontal Slider instead of a vertical one. Make sure you select the Vertical tab on the right-hand side of the form.

Use the Insert button to insert the Pump_1_Speed tag.

Note that if the Continuous update of tag option is checked, then the tag will be written to while it is being dragged.

In the At Maximum edit box type the height in pixels that you wrote down earlier.

Click OK.



Now is a good time for a regular page save. Click the save icon.

You can compile, and run the project again to test these changes before continuing to the next chapter. If CitectSCADA is still running from your previous test, you will need to compile and reload the page before updates are picked up by the running system.

Advanced exercise: If you're feeling adventurous, you can add a disable function to the slider (just like we did for the on/off button), under the Access tab.

Quickstart Tutorial V7.20

Creating Graphic Pages, Configuring Text

We will now place some static text above the buttons to label the controls.



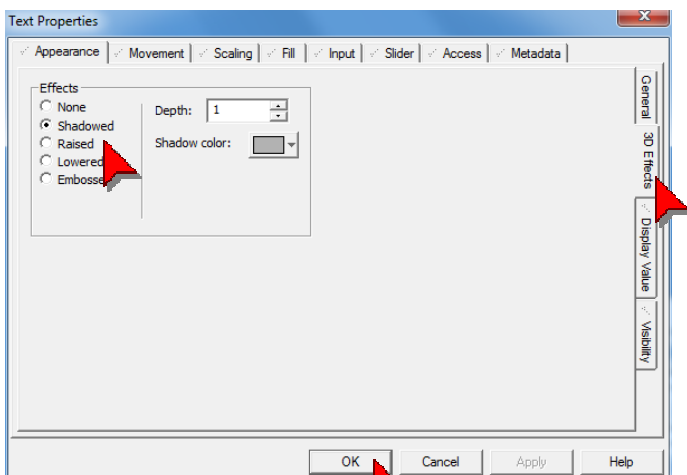
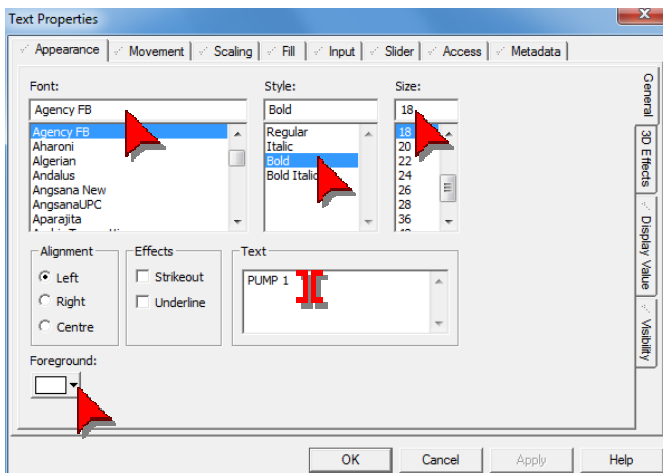
Click on the letter A on the Toolbox.

Type "Pump 1".

Note: If you do not see the letters that you type it is most likely because the currently selected color is the same as the background color of the page.

Place the cursor above the buttons and click to position the text that you have typed. An appearance form will be displayed to allow further customization of the text.

Adjust the format and 3D shading to suit your preferences, then click OK.



Quickstart Tutorial V7.20

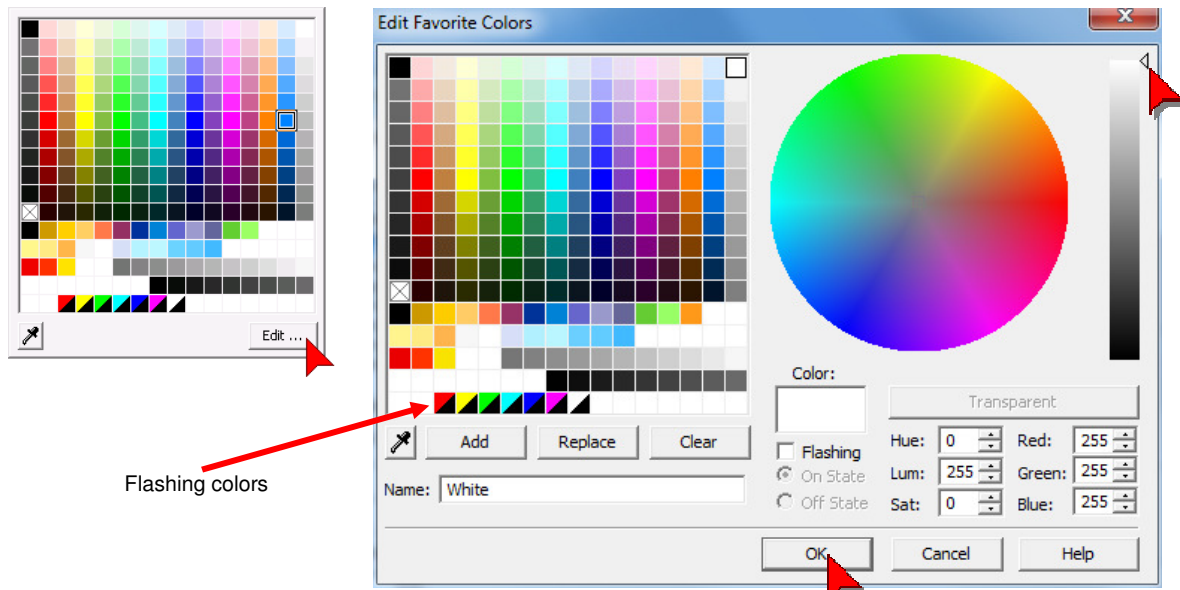
Creating Graphic Pages, Creating Colors

CitectSCADA supports True Colors. This allows far greater flexibility when importing images, as well as managing colors quickly and easily.

The default palette contains 128 commonly used colors however this does not restrict the number of colors you can actually use in your project.

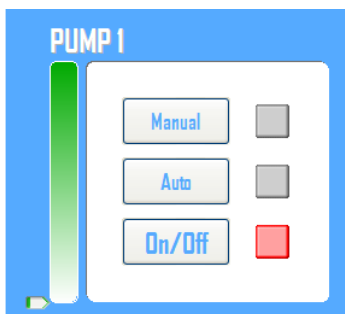
Double-click on the Pump 1 text on your graphic page to open the Text Properties form again. Click on the Foreground color.

Click on Edit. Another color form will display, allowing you to customize the color either using the mouse, or by entering the RGB indices for specific values.



You can use a variety of options in this color editing dialog to adjust the color to any of the 32 million true colors available (provided your computer supports 32bit colors). In our case, we will simply Slide the Shading Cursor on the right-hand side up to a very pale shade, then click OK to finish and transfer the new color to your graphics object.

Once you are satisfied with the color of your text click OK.



Save your page.

Quickstart Tutorial V7.20

Creating Graphic Pages, Configuring Numbers

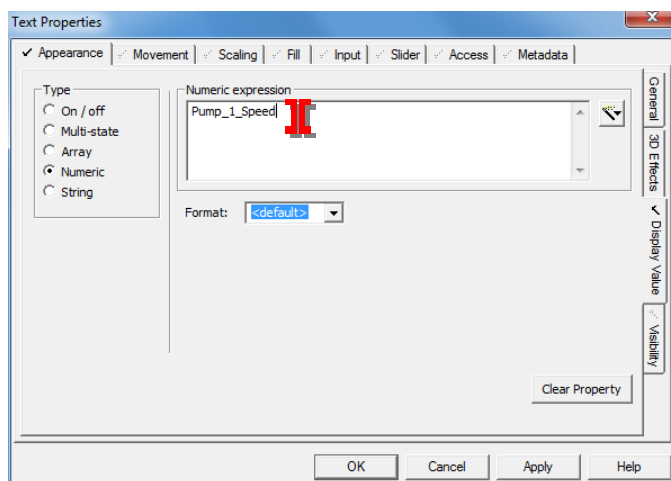


On the Toolbox, click on the number tool.

Click to place the number below the gradient rectangle.

*The Number tool is actually the Text tool.
When you access it via the number tool icon
you are presented with the Display Value sheet
instead of the General Appearance sheet.*

Use the Insert Tag button to enter the tag Pump_1_Speed. Leave the data format field to the default, and the format you specified in the tag definition will be used.



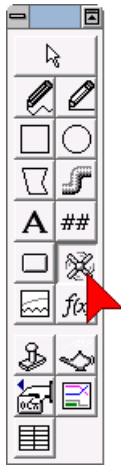
Click on the General tab on the right-hand side and adjust the formatting to suit your preferences, then click OK.

Test your page.

Quickstart Tutorial V7.20

Creating Graphic Pages, Pumps & Piping

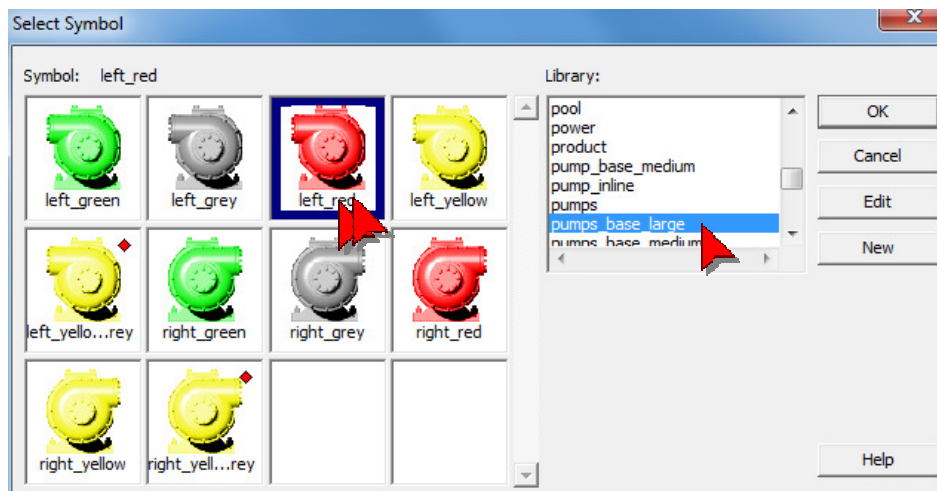
Next we will add a picture of the pump itself, a tank and some piping.



Click on the Symbol Set tool.

Click below the new rectangle to place the symbol set on the page.

Click on the Set button next to the OFF Symbol edit box to change the Off symbol from a black light to a red pump. In the Library list, use the scroll bars to scroll down and then click on pump_base_xlarge. In the Symbol window, Double click on the left_red symbol.

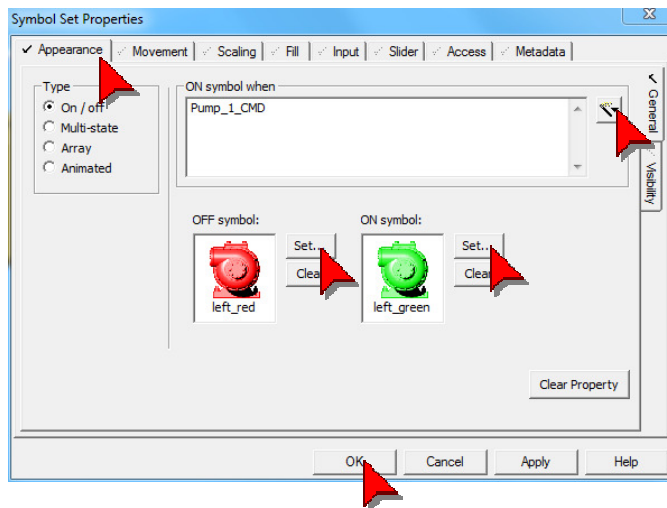


Click on the Set button next to the On Symbol edit box to change the On symbol from a red light to a green pump. Using the same technique as above, locate the left_green pump then double click on it.

Use the Insert button to insert the tag Pump_1_CMD. Click OK.

Quickstart Tutorial V7.20

Creating Graphic Pages, Pumps & Piping continued...

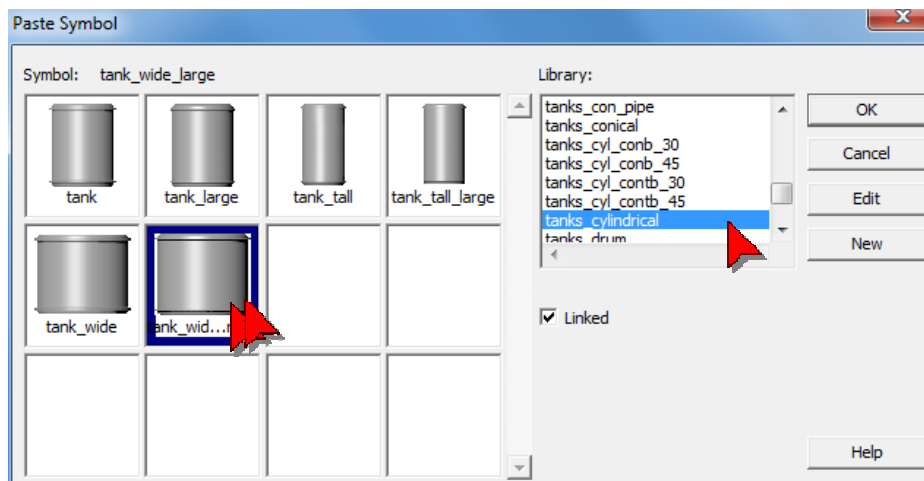


Configuration of the pump's animation is now complete. We now need to add source and destination receptacles along with accompanying pipework and the page will be complete.



Click on the Static Symbol Tool in the ToolBox.

Using the scroll bars, locate the tanks cylindrical symbol library, and then double click Tanks_cylindrical. Click and drag the tank to position it on the left-hand side of the page.



Repeat for a second tank, this time using the tanks_cyl_conb_30 library, with the tank_large symbol, positioned on the right side of the page, above the pump.

Quickstart Tutorial V7.20

Creating Graphic Pages, Pumps & Piping continued...



Click on the Pipe Tool in the ToolBox.

The Pipe tool generates 3D rendered polylines with node points that identify bends or junctions. Pipes can be color filled the same as any other drawing object in CitectSCADA, and will render the flooded color in 3D.

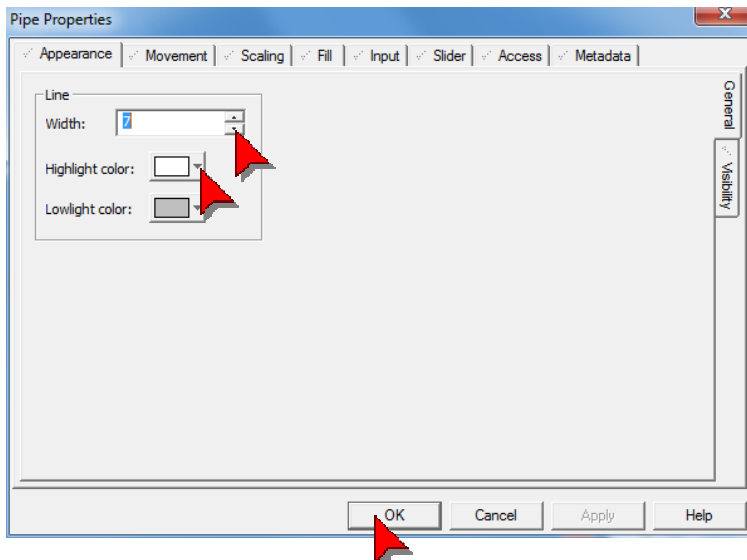
We will now draw two separate pipes, one from the source tank on the left side of the page, and one to the destination tank on the right side of the page.

To draw the right-hand pipe:

- With the pipe tool selected, Hold down the Ctrl Key (forces only horizontal and vertical lines to be drawn)
- Place cursor on top of the right-hand tank in the approximate center, click and hold down the left mouse button and move mouse downwards. Release mouse key when you have moved far enough to draw the first leg of the pipe
- Move mouse to the left (release the Ctrl Key to allow diagonal pipes if you wish), and click again to create the second leg of the pipe
- Continue until you are satisfied with your pipe's route and double click to end the pipe at the pump.

Note that you can return and adjust the individual junctions of the pipe to fine-tune its position and shape later.

Release the Ctrl Key when you are finished the pipe and the pipe properties form is displayed. Select a pipe highlight color of white and a width of 7, and then click OK to close the pipe properties form.



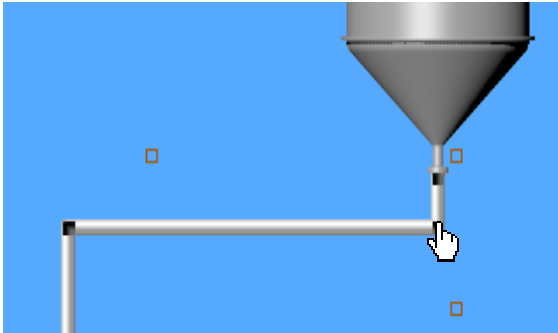
Quickstart Tutorial V7.20

Creating Graphic Pages, Pumps & Piping continued...



When items are grouped, double-clicking on them will access the group configuration, however objects inside of the group can have their own animation properties independently of the group's properties.

To access the individual objects within the group, hold the CTRL key down while double-clicking the object.




To adjust the pipe, select it by clicking on it. The ends and bends of the pipe will have small nodes shown, which can be clicked on and dragged to reposition them.


Bounding boxes allow the dimensions of the pipe to be adjusted, and will scale the pipe accordingly, and will not adjust the width of the pipe.

Carefully manipulate your pipe to align with the outlet of the tank, and feed into the pump approximately halfway through its radius.

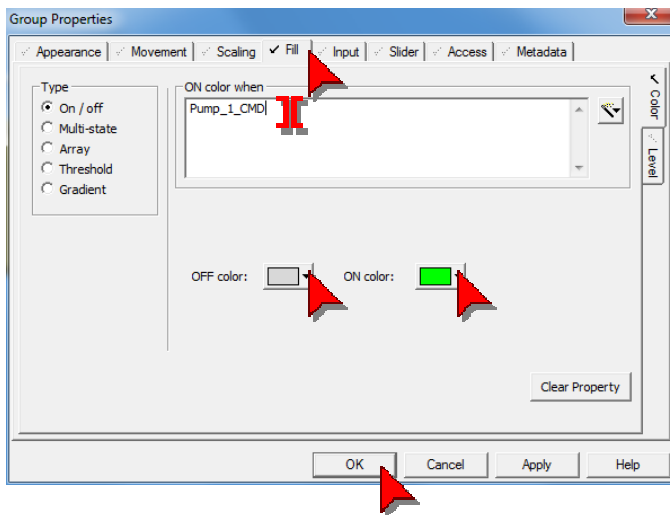
Repeat this process to create another pipe on the left-hand side of the pump feeding into the second tank. Don't worry if you add a small section to one end of the pipe when you double-click as the pump or tank symbol will conceal it once we push them to the back.

Once you are satisfied with the position and shape of both pipes, select both pipes by holding down the Ctrl Key and clicking on each pipe. Release the Ctrl Key.

Click the Group button  on the tool bar (or select Group from the Arrange menu).

Click the Send to Back button  on the tool bar (or select Sent to Back from the Arrange menu).

Double click on either of the pipes that you have drawn. You will notice that the configuration dialog displayed is for Group Properties rather than Pipe Properties. All configurations you now perform will apply to all objects contained within the group, in this case, the two pipes.



Click on the Fill Tab. Insert Pump_1_CMD tag into the ON color edit box.

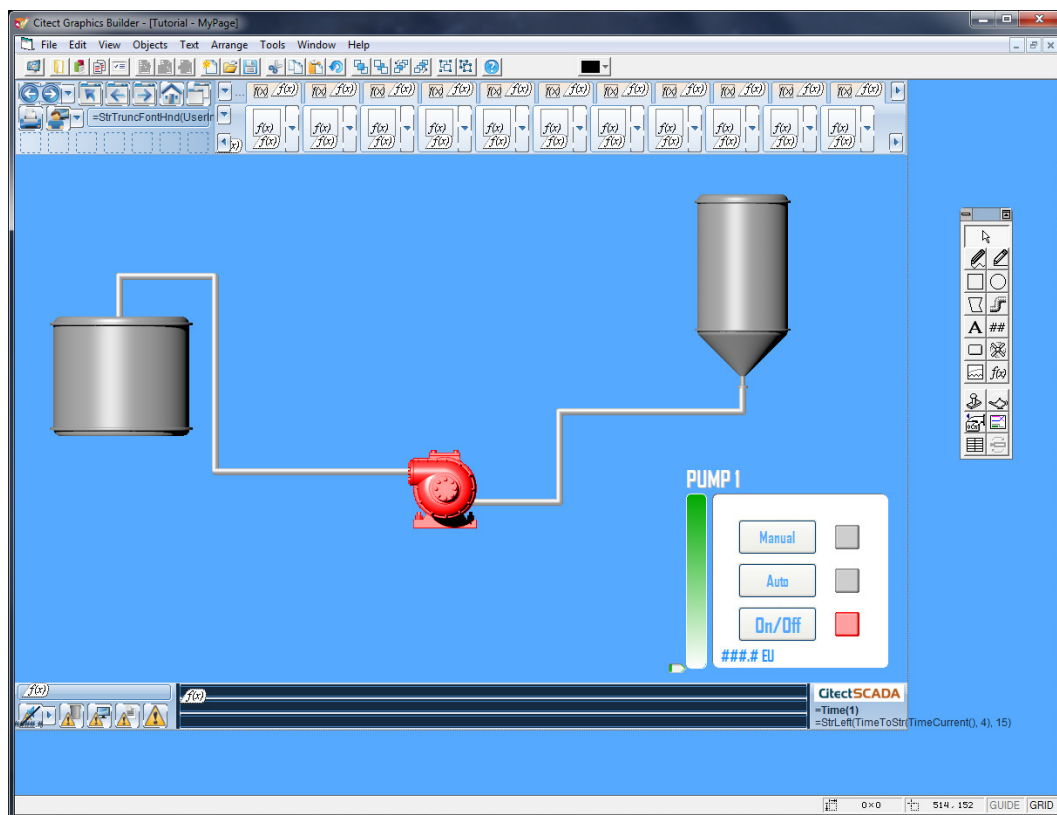
Set the Off Color to light grey and the On Color to Green. Click OK.

Your configuration of the pipe work is now complete.

Save the page.

Quickstart Tutorial V7.20

Creating Graphic Pages, Pumps & Piping continued...



Your graphical configuration for this tutorial is now complete. You can test this by running the project again, and then continue to the following sections which address color management, alarm handling, and trending.

If you'd like to practice the skills you have just learned, try adding a bar graph to the tank to indicate level (you can add a slider to simulate a level transmitter). You will need to create a new analogue tag to achieve this.

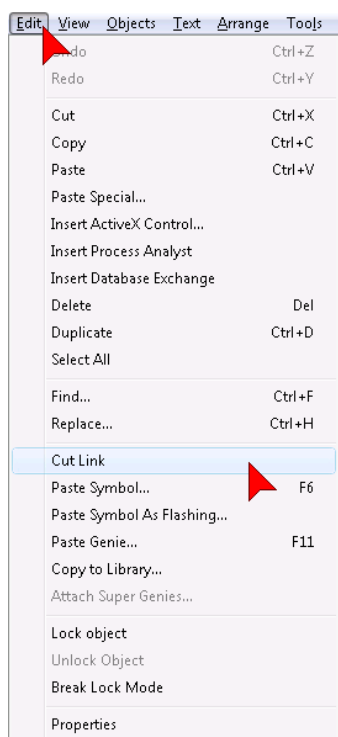
Quickstart Tutorial V7.20

Creating Graphic Pages, Managing True Colors

CitectSCADA comes with two excellent tools for adjusting colors, making it very easy to manipulate images from shades of red to green to yellow and so on, even for very complex true-color images.

We will manipulate a simple image in this example, but the same principles apply to any true color image that you create or import to the application.

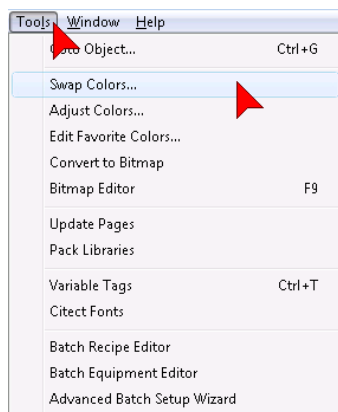
Click on the left-hand Tank symbol to select it.



From the Edit menu, select Cut Link. This will sever the symbol's link with the library and allow us to manipulate it as a stand-alone object. If we did not sever this link, then we would have to modify the object in the library rather than on the page, which would distribute the change to all instances of the object throughout the project.

Note that you should never modify the libraries that are supplied with the product. If you require a variation of these objects, you should save them into your own library, and create the variations there.

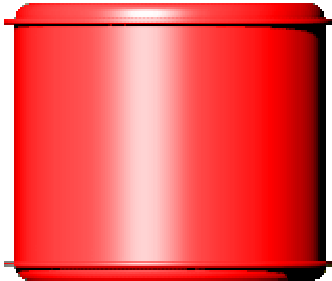
From the Tools menu, select Swap Colors.



Quickstart Tutorial V7.20

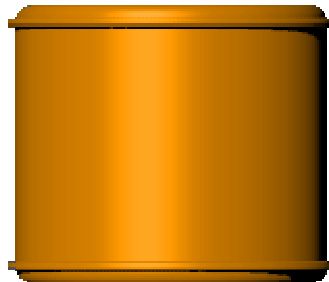
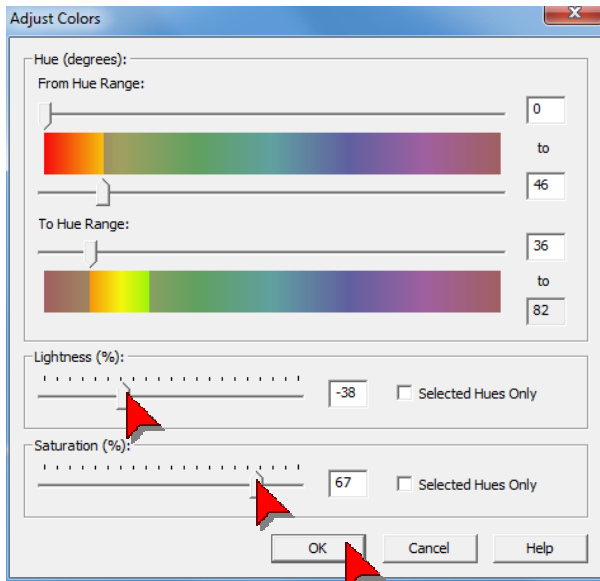
Creating Graphic Pages, Managing True Colors continued...

Making sure that the Swap Range option is selected, select any shade of grey for the From Color, and any shade of red for the To Color, then click OK. The tank should now be a 3D rendered red variation of the original grey object.



For more flexible color management, you can use the Adjust Colors tool, also available from the Tools menu. This tool allows you to select from a flexible range of colors for migrating from one hue to another, as well as adjusting saturation and darkness at the same time. This can be very useful when one color range does not translate well to another.

Use the Adjust Colors tool to change your purple tank to green, and darken the hue by 20%.



These techniques give you complete control over the full 32 bit color pallet when creating and modifying symbols and other graphics items

Repeat this exercise for the right-hand source tank and make it a 3D rendering of green instead of grey.

Quickstart Tutorial V7.20

Accessing Alarm and Trend Display Pages


CitectSCADA comes with a number of pre-built pages. This includes:

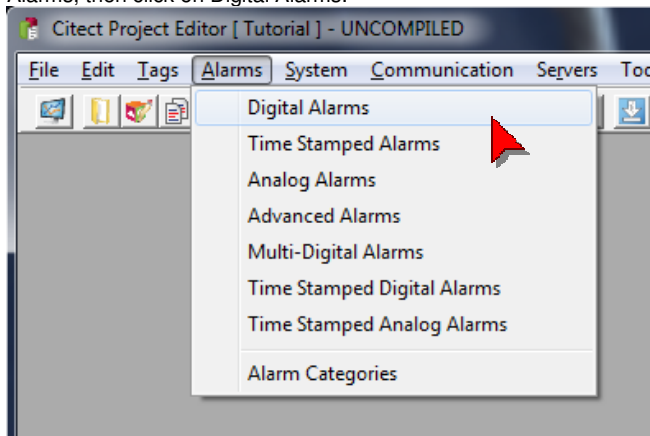
- *Alarm*
- *Summary Alarms*
- *Disabled Alarms*
- *Hardware Alarms*
- *Trends*
- *Double Trends*
- *Popup Trends*
- *Instant Trends*
- *Administration Tools*

As well as the page template which we are already using which provides built-in navigation and alarm shortlist features.

These pages provide comprehensive functionality and can be accessed directly from the navigation menu provided at the top of each page, or via the alarm icons at the bottom left of each page. However to make these pages useful, we must first define some alarms and trends in the project.

Configuring Alarms

Switch to Citect Project Editor (click on the  icon or use Alt+Tab keys). In the Project Editor Menu click on Alarms, then click on Digital Alarms.



Fill in the Digital Alarms form for a single alarm as shown below. Remember it is better to use the drop downs to ensure data is entered correctly. When the form is complete click Add.

Remember that pressing Enter will add another record to your alarm list, so make sure the form is complete first, or use the Add button.

Quickstart Tutorial V7.20

Configuring Alarms continued...



TIP

In the Variable Tag fields, you can place an expression (eg. Pump_1_Mode = 0) to reverse the alarm detection logic.

Click on the icon to close the Digital Alarms form when you are finished.

Configuring Trends

Now we need to configure a trend tag to store trend data. Switch to Citect Project Editor (click on icon or use Alt+Tab keys). On the Project Editor Menu, click on Tags then click on Trend Tags.


Fill in the Trend tag form as below then click Add. Remember to use drop downs where possible.

Quickstart Tutorial V7.20

Configuring Trends continued...

This configuration will log the Pump_1_Speed to disk every ½ second. Most installations would typically log the majority of their data at 2 seconds or slower except for their critical operating measures.

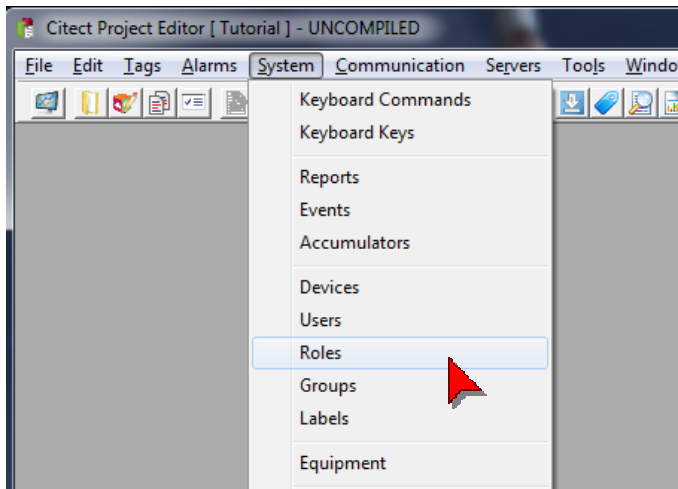
There are many more trend features available in Citect. Press F2 with this form open to see some of the advanced possibilities. Pressing F2 again will return you to the basic menus.

Click on the  icon to close the Trend Tags dialog.

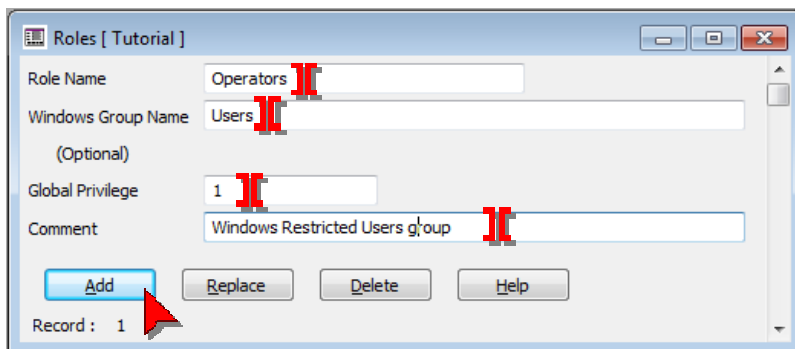
Configuring Security

In addition to any security that we might configure on our own objects, we also need to define security login credentials to access all of the functionality available from the built-in pages supplied with Citect. Switch to the Citect Project Editor.

On the Project Editor Menu, click on System then click on Roles.



An Administrators Role for the project was created for us when we created the project from the Starter Project. We will now configure a role for Operators. Add the Windows "Users" group to have access to privilege level 1 across all areas of the project. Fill in the Roles form as below then click Add.



Privilege levels are unique by default, not hierarchical. This means that a user with privilege level 6 does not automatically get access to level 5 functions.

If you want your users to have access to more than one privilege level, then you should include all of those levels in the privilege field as shown in the configuration examples.

To change the behavior of the system to hierarchical privileges, refer to the online help

Quickstart Tutorial V7.20

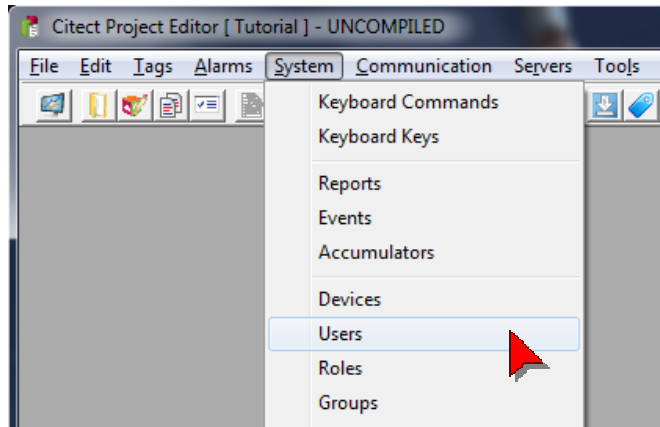


You can replace individual instances of found items by clicking on them and selecting Replace.

TIP
If a graphics page is open when changes are made to it using the replace feature, you will need to manually save the page to persist the changes.

Configuring Security continued...

In addition to Windows linked groups, we will add a local Citect user. On the Project Editor Menu, click on System then click on Users.



Fill in the Local User form as below then click Add.

The password fields contain “*” to hide passwords from prying eyes. Do not type *, instead type “citect” into this field. The asterixes will appear as you type to hide your entry from prying eyes.

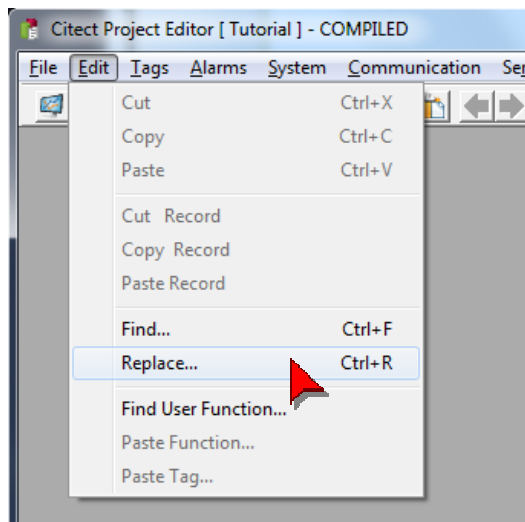
By choosing Administrators role we have assigned maximum security privileges to this user throughout the project and it will be able to access the advanced tools available from the navigation bar.

Click the close  button when you have finished.

Quickstart Tutorial V7.20

Using Find and Replace

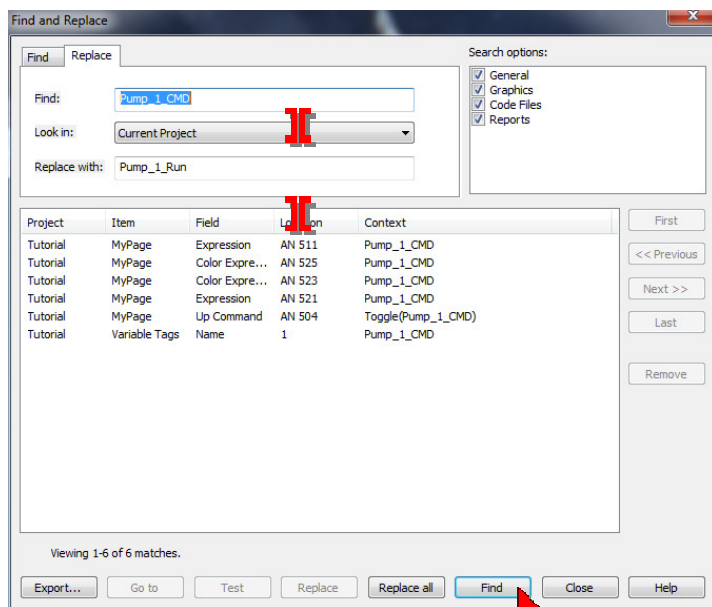
We are going to perform rework on the variable tag Pump_1_CMD. We are going to change its name to Pump_1_RUN to better represent its function. Rather than searching the entire project for each place this tag is used, we are going to use the project search and replace feature to perform this exchange for us.



Switch to the Citect Project Editor. In the Project Editor Menu, click on Edit then click on Replace (or use Ctrl-R).

Type "Pump_1_CMD" in the Find box, and "Pump_1_Run" in the Replace with box. Make sure Current Project is selected, along with all search options checked.

Click Find.



The utility will display a list of all locations where the Pump_1_CMD tag is found.

Click Replace all.


Confirm the replace when prompted, and (if you still have the page open), switch to the graphics builder to save changes to your page.

Congratulations. You have completed the offline configuration portion of this tutorial. The following sections show you how to configure the online portions of the project.

Quickstart Tutorial V7.20

Runtime

Now it's time to run your project and test it to make sure that you have completed the tutorial correctly.

Compile your project, then click on the Runtime  icon.

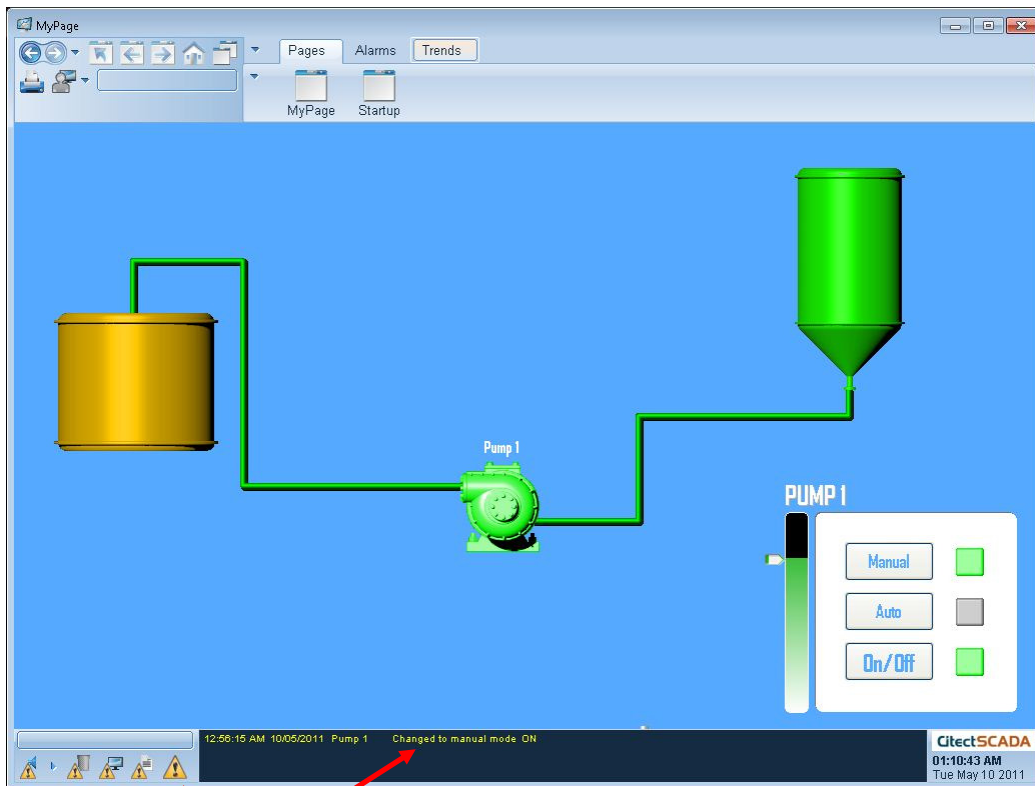
Use the navigation menu to access your graphics display called MyPage.

Click on Auto button then click On Manual. Click On/Off.

You will see that both pipes change color as the group properties you configured will be applied to everything in the group, in this case both pipes.



Use the back button at runtime to go back through the pages that you have visited.



You will also see an alarm is generated and displayed on the alarm bar at the bottom of the page when you switch to Manual mode. The Alarm icon at the bottom left will flash to indicate that you have new, unacknowledged alarms.

If you right-click on the alarm you will see a popup menu with options to acknowledge and disable the alarm. These are currently disabled because you have not logged into the runtime yet. It is running as a user with no privileges.

Click on the flashing alarm icon, or use the Alarm menu at the top of the screen, to access the Active Alarms page. This is the page we just created from the "alarm" template.

TIP

If MyPage, or the objects on it, were assigned Areas and Privileges, then you would not be able to navigate to it and use the button controls when you initially start the runtime. You would need to login first.

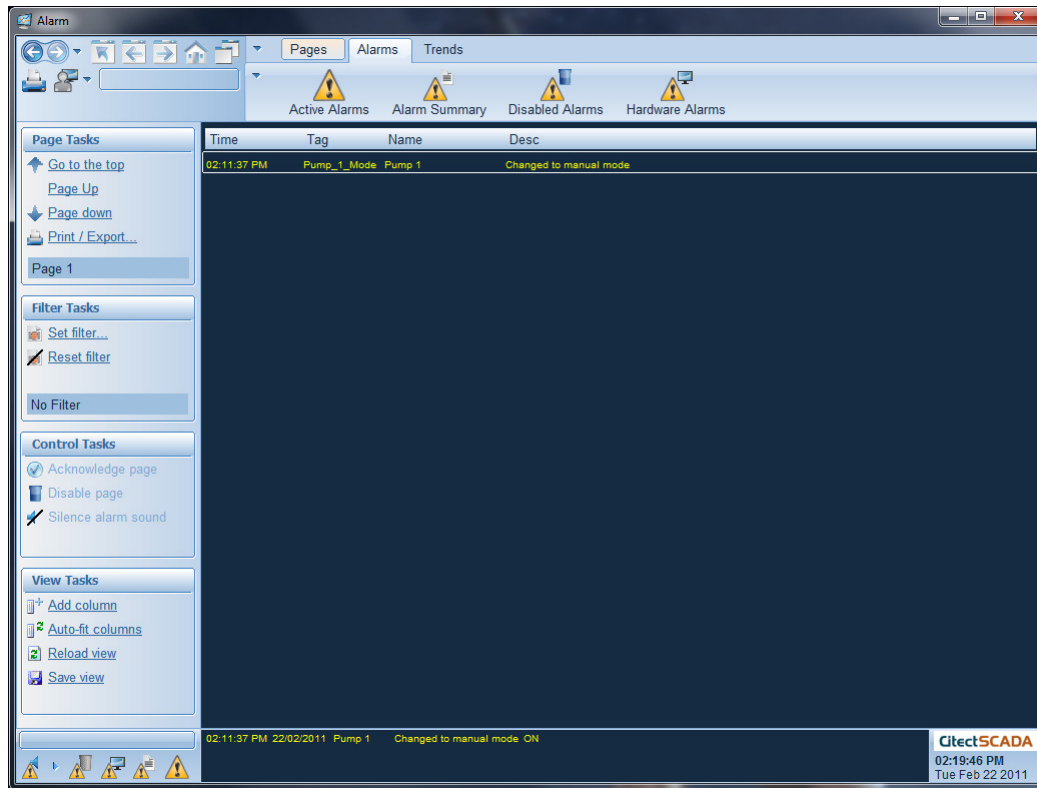
Quickstart Tutorial V7.20

Runtime continued...



TIP

Windows users local to the Citect PC can use the login name directly, but domain users will require the domain name, followed by a backslash, then the user name.



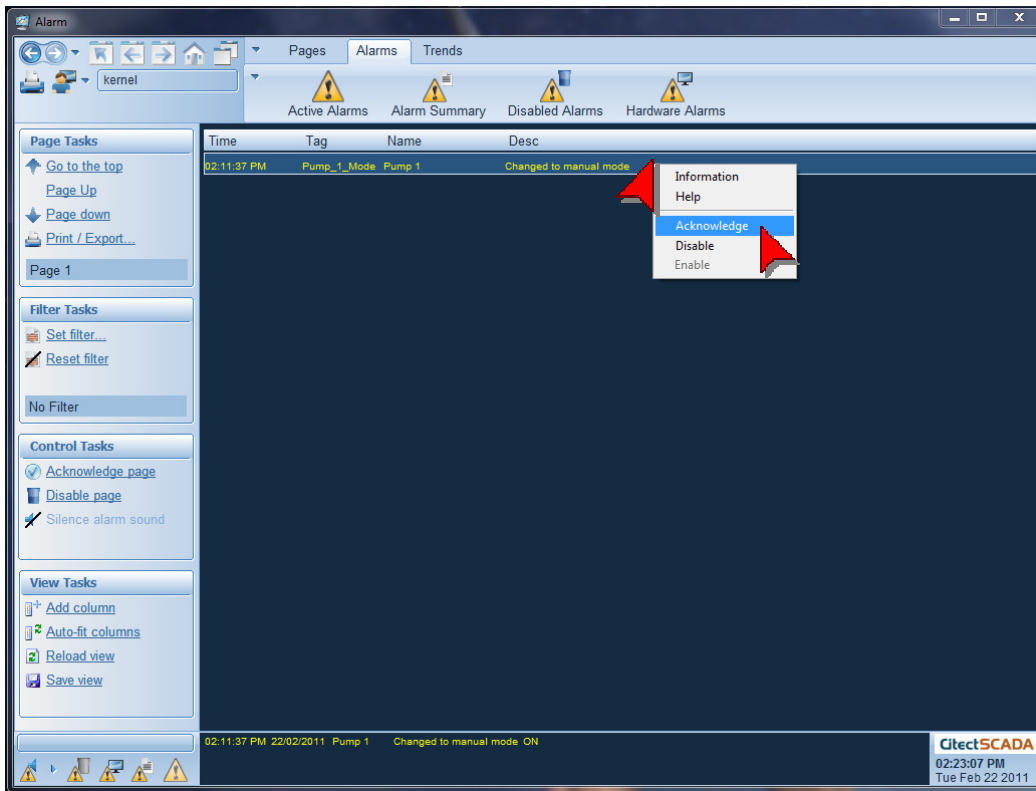
If you try to acknowledge the alarm from the alarm menu at the top left of the screen, or by right-clicking on an alarm, you will notice that you do not have access to these features. By default you require a privilege level of 1 to use these features. To modify the defaults, refer to the online help.

Click on the Logon button or pull-down menu on the navigation bar. This will produce a Login form in which you can enter your user name and password as shown below. Use the local Citect user we created called kernel, with a password of citect. Alternatively, you can login using the same credentials you use to login to your PC.

If your login was successful, you should see the logged in user name at the top of the page. The alarm acknowledge functions will now be available to you.

Quickstart Tutorial V7.20

Runtime continued...



Once logged in, try accessing the alarm acknowledgement features again. This time they will work.

You will notice that the alarm changes color once acknowledged, and disappears when you return the pump to automatic. If the pump returns to automatic and you have not acknowledged the alarm, it will remain on the screen until you do acknowledge it. This ensures that the operator never misses an alarm occurrence.

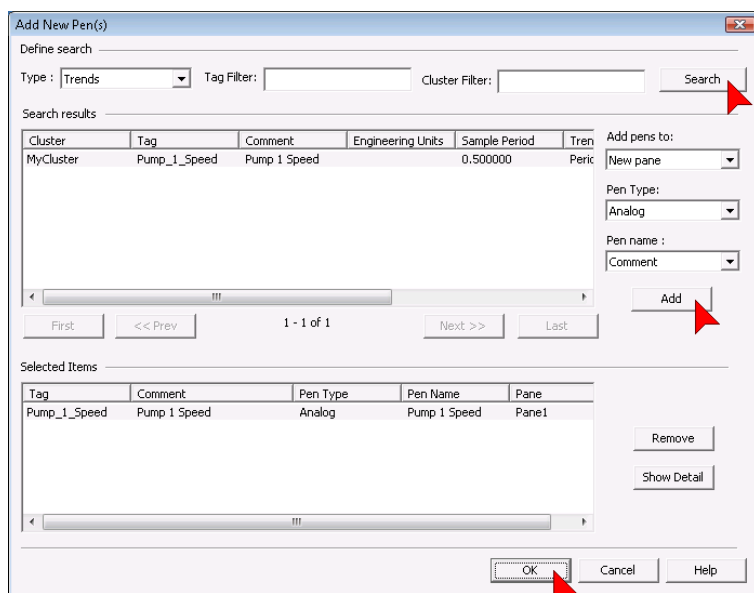
Quickstart Tutorial V7.20

Runtime, Process Analyst

CitectSCADA has facility for viewing trends and alarms against a time-axis. The Process Analyst is an ActiveX object that can be embedded on your own page, or you can use the default page provided.

Select the Process Analyst from the menu bar at the top of the page. Initially this is an empty container ready to be configured.

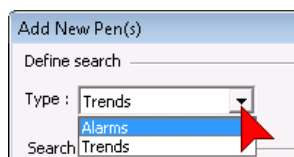
Click on the Add Pens  button.



Cluster	Tag	Comment	Engineering Units	Sample Period	Tren
MyCluster	Pump_1_Speed	Pump 1 Speed		0.500000	Peric

Tag	Comment	Pen Type	Pen Name	Pane
Pump_1_Speed	Pump 1 Speed	Analog	Pump 1 Speed	Pane1

Click on Search to find all configured trend pens. Select the Pump_1_Speed pen and click Add.



Tag	Comment	Pen Type	Pen Name	Pane
Pump_1_Speed	Pump 1 Speed	Analog	Pump 1 Speed	Pane1

Now change the Type from Trends to Alarms. Repeat your search and select Pump_1_Mode from the alarm list. Click Add then, when you are finished, click OK.

A new display pane will be added to the page displaying both the Pump_1_Speed analogue pen as well as the Pump_1_Mode digital alarm pen. If the gridlines do not appear, click on the graph area and it will refresh the display.

Experiment with some of the control buttons (described on the next page), or click-and-drag on the graph itself to move through history.



The Process Analyst can have many display panes. Each pane supports both digital and analogue pens.

To create multiple panes, you will need to customize the toolbar so that the **Add Panes** button is available to you (see the Online Help). Alternatively, you can create a new pane each time you are selecting new pens for display.

Quickstart Tutorial V7.20

Runtime, Process Analyst continued...



Display/remove pen cursor. Once displayed, click and drag the cursor to reposition it on the graph.



Display/remove pen cursor labels. Once displayed, click and drag them to reposition them on the graph.



Toggle the object pane at the bottom of the page which lists display pens. This creates more room for the graph pane.



Toggle Auto-Scroll.



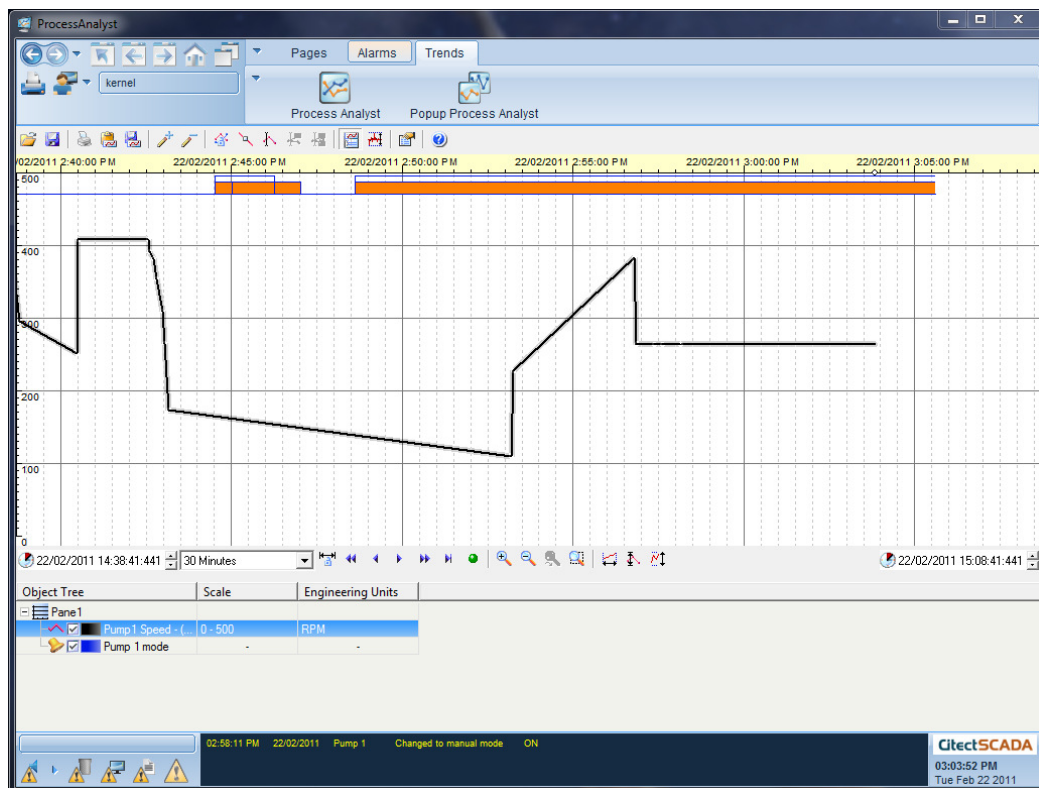
Zoom in 50%




Zoom out



Zoom using a click-and-drag zoom box



We will now modify the appearance of the Process Analyst display. Click on the Properties  button.

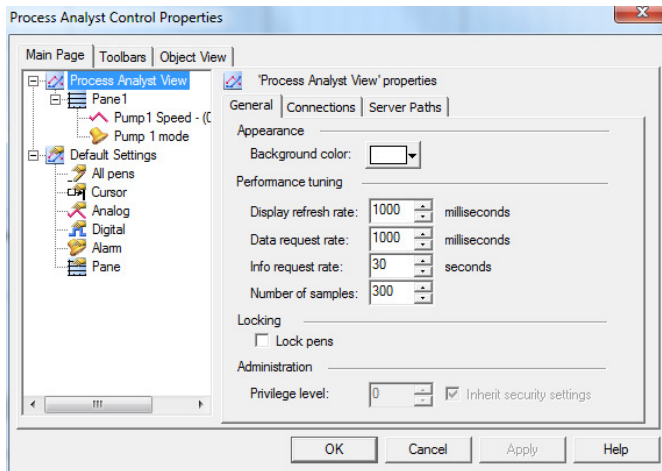
Quickstart Tutorial V7.20

Runtime, Process Analyst continued...



Interpolation is the manner in which the display shows links between sample points. Straight means that it draws a line directly between two points. Stepped means it holds the last sample value until it reaches the time of the new sample, and then 'steps' to the new value.

Stepped interpolation is a more accurate indication of the samples that Citect SCADA has recorded



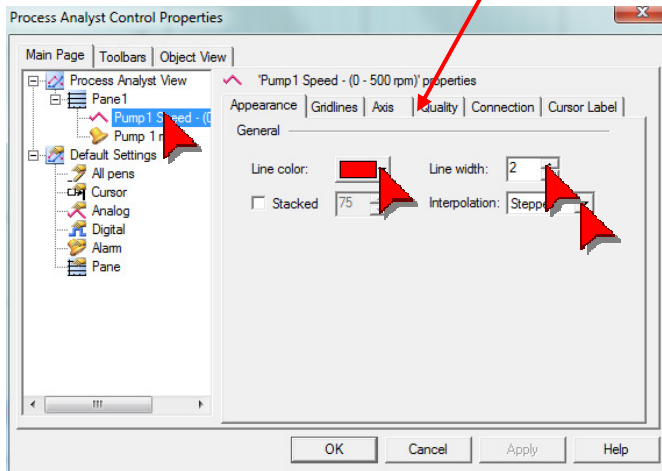
Expand the tree to Pane 1 and modify the background color. You can select from the color palette, or create new palette items by entering the Red, Green and Blue values directly.

In this case, enter 250, 250, 190, for Red, Green and Blue respectively, then click Add to Custom Colors.

Select this new color and click OK to record the change.

Click Apply to see the effect on your Process Analyst view.

Now select Pump 1 Speed in RPM beneath Pane 1 in the properties tree.



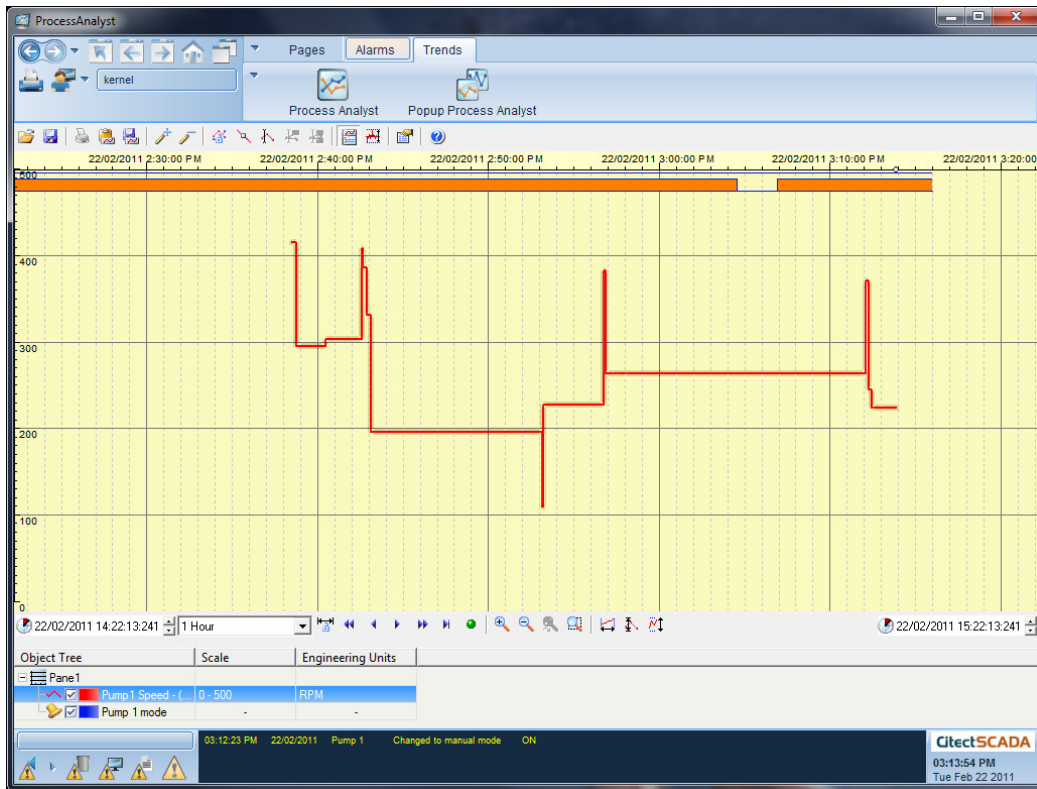
Change the line color to bright red and the width to 2, and the interpolation from Straight to Stepped.


Click OK to see the effect on your Process Analyst view and close the properties window.

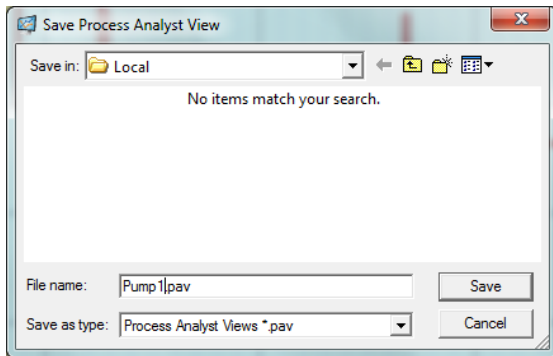
Quickstart Tutorial V7.20


Runtime, Process Analyst continued...

Finally, resize the Object pane to maximize the graph pane while still showing the list of pens.



Your Process Analyst view is now complete, but before you leave the page, click on the Save  button. This will allow you to save the Process Analyst configuration you have just entered, and retrieve it again later on.



Fill in the file name and click Save. This will allow you to return to this view quickly at a later time using the Load View  button.


Now head back to MyPage, and manipulate the pump mode and speed, then return to this page to witness the affect your activities have had over time.

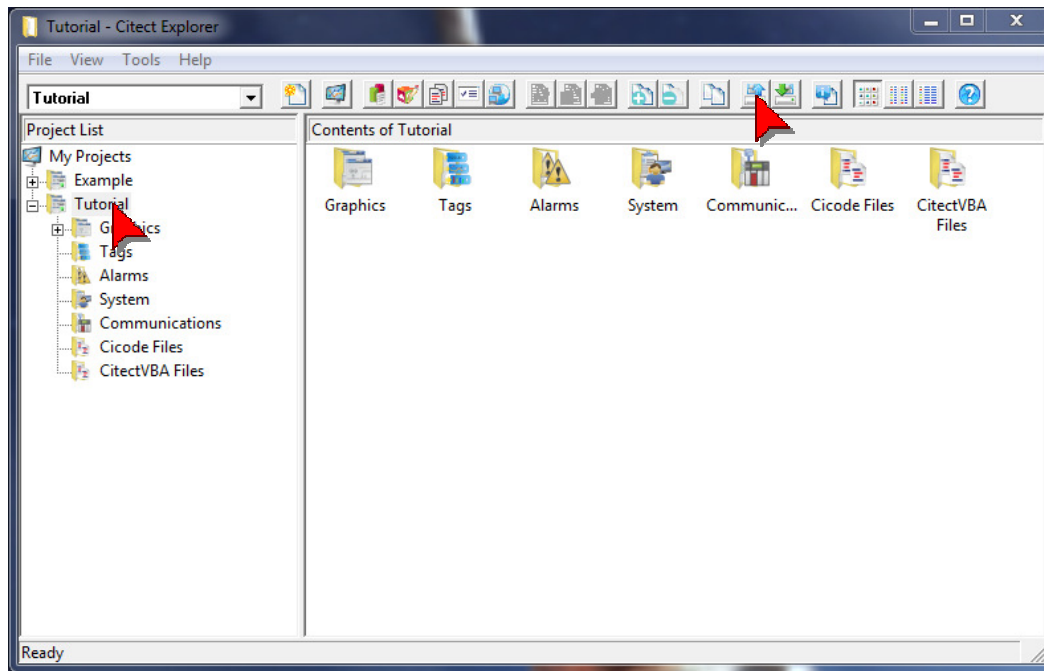
Quickstart Tutorial V7.20

Backing Up Your Project

It is important to keep backup copies of your project, so that you can always recover from a disaster with minimum effort.

Make sure you are in the Citect Explorer (click on the  icon or use Alt+Tab), and have the Tutorial project selected.

Click on the Backup icon .



Use the Browse button to locate a directory where you want to save your files to. Alternately you can type the directory and filename into the Backup File edit box. If the directory does not exist CitectSCADA will automatically create it for you when it saves the file.

Click OK and when the Backup Complete message pops up, click OK on that also.

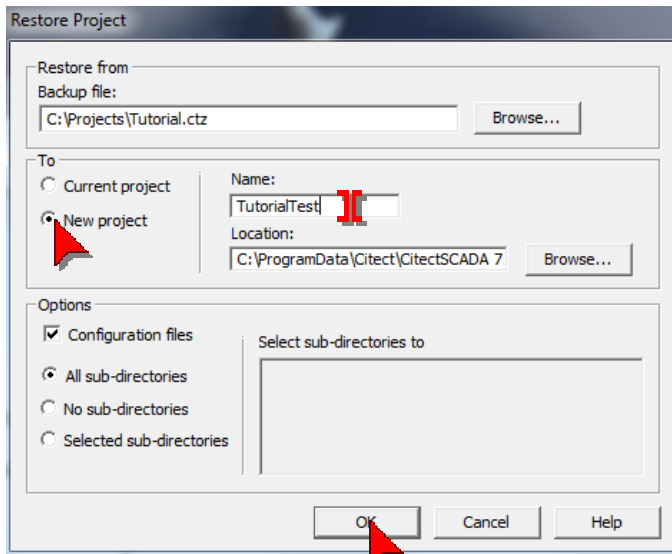


Quickstart Tutorial V7.20

Restoring Your Project

With any software, it is good practice to check and make sure you can restore from your backup copies. It is very rare to experience problems restoring from a CitectSCADA backup but the time taken to check is a tiny fraction compared to the time it would take to re-create the project from scratch.

Click on the Restore icon  (it is next to the backup icon), on the menu bar click Tools then Restore.



Click on the Browse button to locate your backup file.

We will restore to a new project, test it, and then delete it, as this is a much better test than restoring over the existing project and less chance of anything going wrong (eg; what if the power fails half way through restoring over the top of your existing project or your backup has a fault in it?).

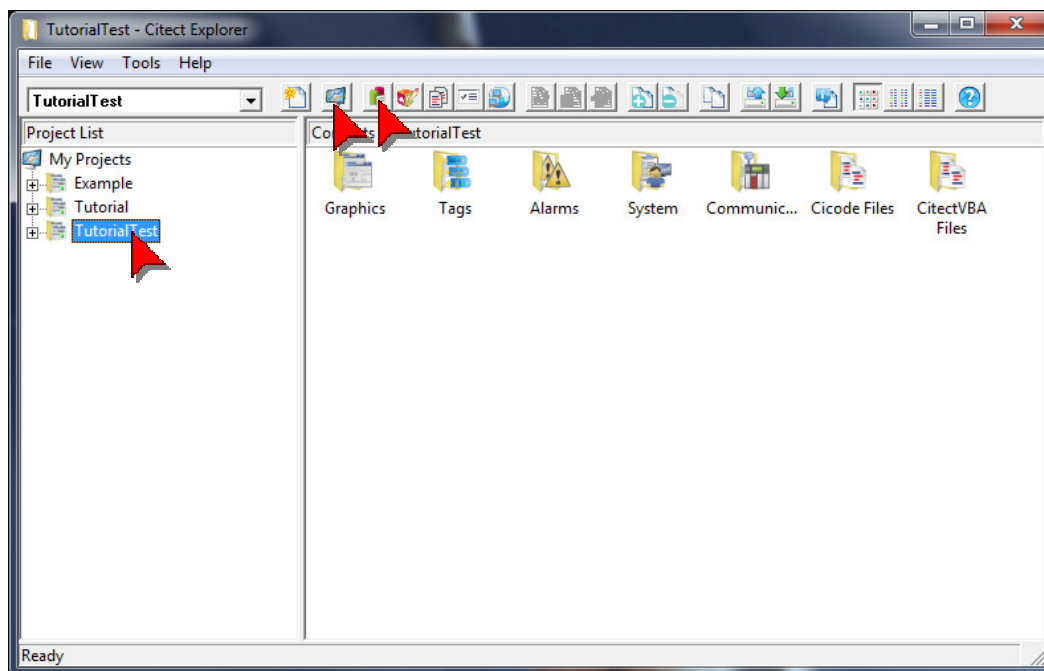
Make sure New Project is checked. In the Name edit box type a name for the new project. e.g. "TutorialTest" then click OK.


When the restore is completed (click OK on the Restore Complete Dialog), click on the TutorialTest project to switch to that project, then change to the Citect Project Editor to compile the project before clicking on the Computer Setup Wizard and repeating the Setup steps identified earlier in this tutorial to configure the computer to run the TutorialTest project in stand-alone mode.

Make sure you have shutdown the Tutorial project prior to attempting to run the TutorialTest project. The Shutdown option can be accessed in runtime by clicking Alt-Space.

Quickstart Tutorial V7.20

Restoring Your Project continued...



Click on the Citect Runtime icon  to make run your project and prove your backup and restore operation was successful.

To delete the TutorialTest project, click File on the Citect Explorer menu, then click Delete Project.

Congratulations! By now you should have a basic working knowledge of CitectHMI/SCADA software. If you are keen to build your level of competency we recommend that you attend a Citect Training Course. Details of training courses can be found at www.citect.com or by contacting your local Citect office or distributor.

If you are keen to learn more, some advanced tutorial topics are located at the end of this document.

Quickstart Tutorial V7.20

Troubleshooting

If you experience results that are different to what you see in the tutorial...


1. Go back and double check what you have done. Most likely you have done something different from the instructions.
2. The tutorial largely assumes CitectHMI/SCADA is freshly installed and default settings haven't been changed. By taking a closer look at the screens in the tutorial you may be able to identify any differences.
3. If problem is in Runtime, shutdown runtime and restart it.
4. Read the Online Help. Most dialog boxes have a help button that provides context sensitive information with just a mouse click.
5. Read the CitectHMI/SCADA knowledgebase. This is available on the CitectHMI/SCADA software CD or from our website www.citect.com.
6. Worst case, start again, just create a new project and call it Tutorial2. The upside to this is the extra practice will make you more proficient.

If nothing appears to happen when you press a button, do not press it repeatedly in the hope that something will happen – chances are your PC is busy trying to do what you've already asked it to do.

Quickstart Tutorial V7.20

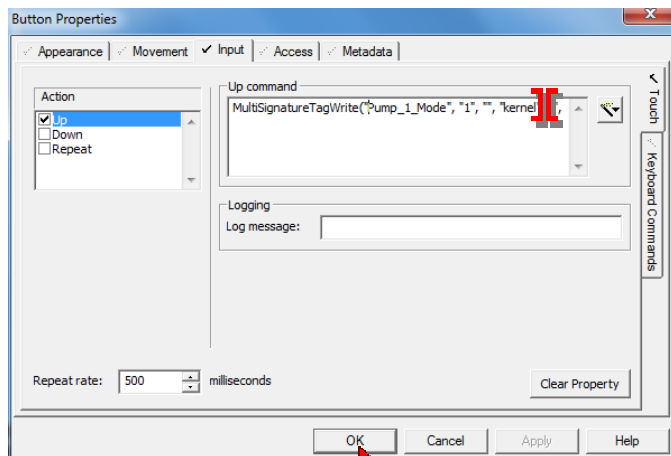
Addendum – Security Validation

CitectSCADA contains security functions to make it easier for companies to implement electronic signatures and multi-user validation. This exercise will modify the Pump 1 manual button to require signature validation before setting the Pump_1_Mode value to 1.

Switch to the Graphics Builder – click on the Graphics Builder icon .

Open your MyPage graphics display, and double-click on the Manual button to access its animation properties. Click on the Input tab, and modify the command to:

```
MultiSignatureTagWrite("Pump_1_Mode", "1", "", "kernel", "", "", "")
```

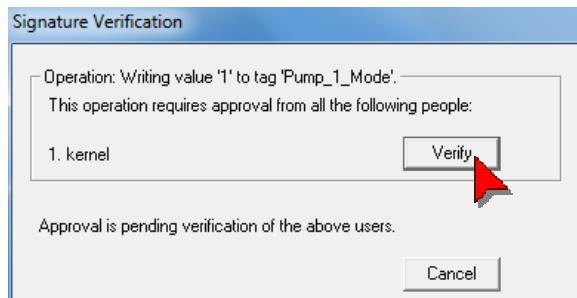


Save your page.

Switch to the Citect Editor and compile your project.

Run your project.

Once the project is running, open MyPage, and click on the Manual button. Instead of immediately changing the pump's mode to manual, Citect will display an electronic signature verification form.

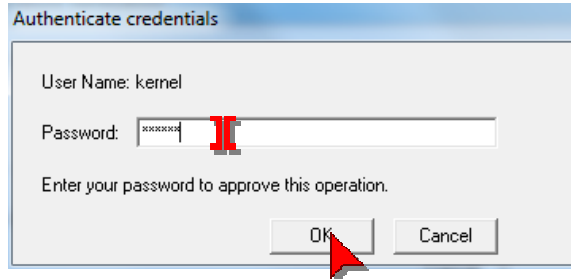


Click on the Verify button.

Quickstart Tutorial V7.20

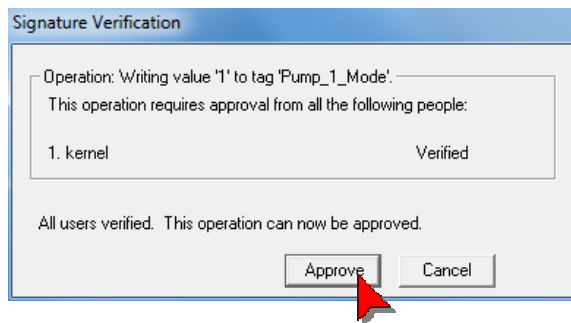
Addendum – Security Validation continued...

A new verification form is displayed, prompting for the kernel user's password. This will display even if the kernel user is already logged in.

A dialog box titled "Authenticate credentials" with a light blue header. It contains a "User Name:" label followed by the text "kernel". Below this is a "Password:" label followed by a text input field containing several "x" characters. A red cursor is positioned at the end of the password field. Below the input field is the text "Enter your password to approve this operation." At the bottom are two buttons: "OK" and "Cancel". A red mouse cursor is pointing at the "OK" button.

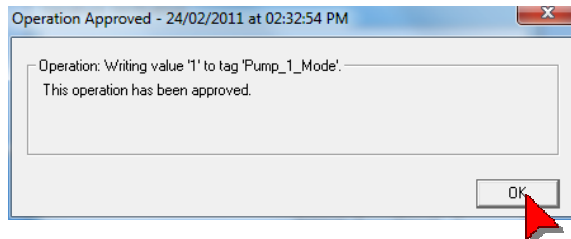
Type in the kernel user's password "citect", then click OK.

A final verification form is displayed, allowing the user to verify that the action should be performed.

A dialog box titled "Signature Verification" with a light blue header. It contains a text area with the following text: "Operation: Writing value '1' to tag 'Pump_1_Mode'. This operation requires approval from all the following people: 1. kernel Verified". Below this text area is the text "All users verified. This operation can now be approved." At the bottom are two buttons: "Approve" and "Cancel". A red mouse cursor is pointing at the "Approve" button.

Click Approve.

An approval dialog is displayed.

A dialog box titled "Operation Approved - 24/02/2011 at 02:32:54 PM" with a light blue header and a close button (X) in the top right corner. It contains a text area with the following text: "Operation: Writing value '1' to tag 'Pump_1_Mode'. This operation has been approved." At the bottom right is an "OK" button. A red mouse cursor is pointing at the "OK" button.

Click Ok. The pump mode will now be changed to Manual.

Further information on electronic signatures and user validation can be found in the online help.

Quickstart Tutorial V7.20

Addendum – Creating Supergenies

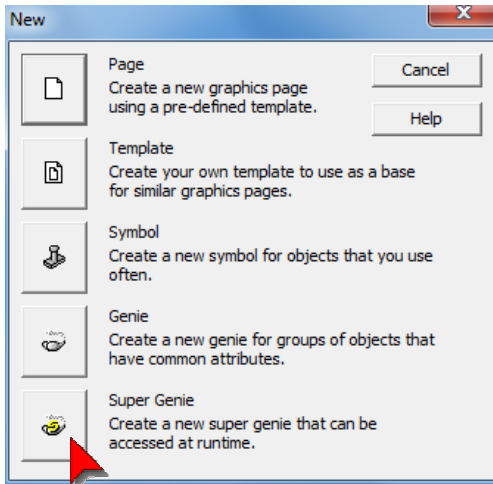
Supergenies are pages which can dynamically switch between different tag groups at runtime. We will create a page which hosts the manual, auto and run buttons for Pump1, and then reuse the page for a new pump which we will add to the project.

When your project grows to include many instances of similar equipment, sequences or other items, supergenies can save you a lot of development time.

Supergenies are configured just like pages, but substitutions are inserted instead of direct tag references. To use Supergenies, you must either link them to Genies (see the next chapter), or call them from Cicode. For more information on Supergenies, refer to the online help.

Click on the New Page  icon.

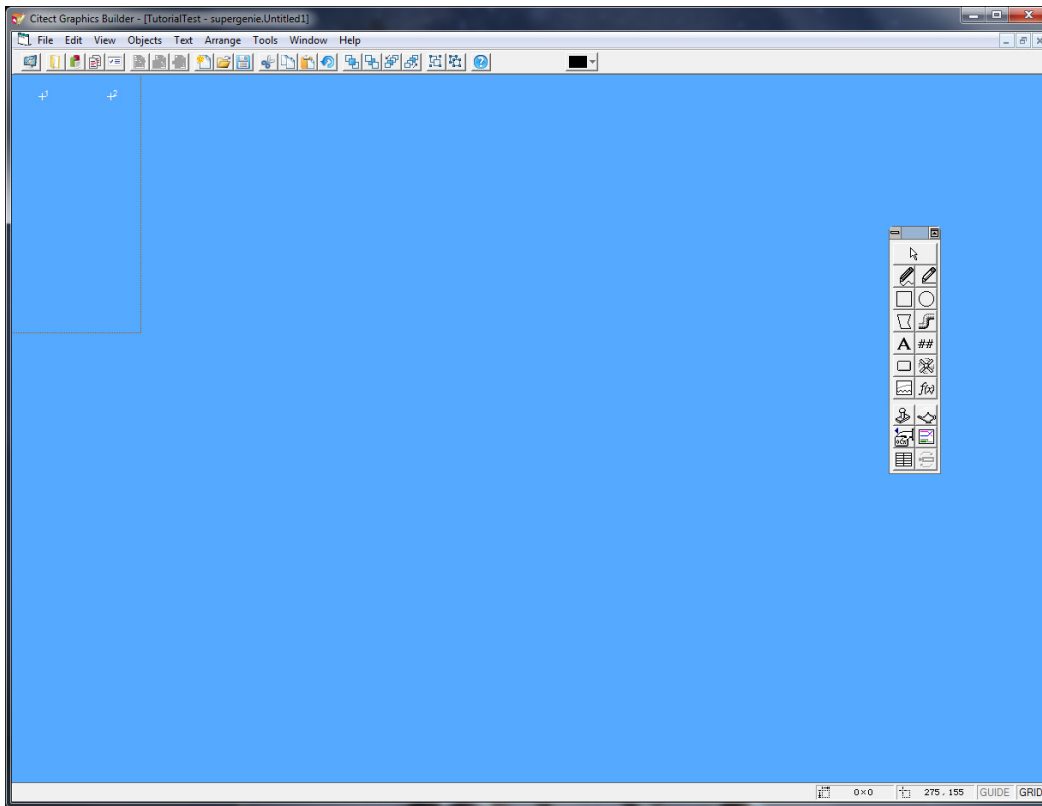
On the popup page, select the Super Genie option.



A new empty page will appear.

Quickstart Tutorial V7.20

Addendum – Creating Supergenies continued...



Firstly, we will add fixed title to our super genie page. We will generally use this page to access pump controls, but it can also be used for any type of equipment that has an On/Off switch and an Auto/Manual mode. So we will just call this page "equipment".



Click on the Text (letter A) icon on the Toolbox.

Type "EQUIPMENT".

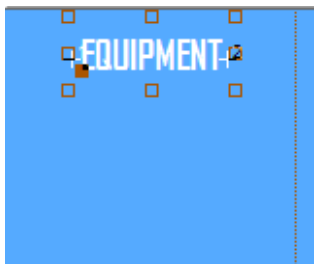
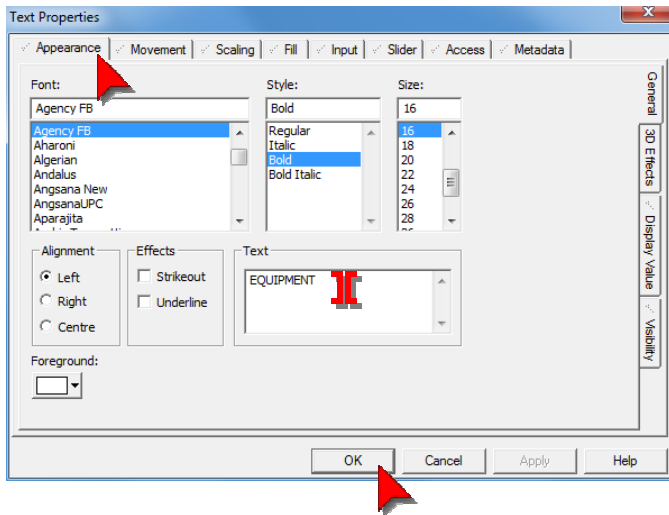
Place the cursor on top of the page.

Then select a font, make it bold and set its font size to 16 (points).
Change the Foreground color to white.

Then click OK.

Quickstart Tutorial V7.20

Addendum – Creating Supergenies continued...



Adjust your title by placing it on top of the page, centered. Don't worry about the animation numbers showing on the screen. Just place your text on top of them.

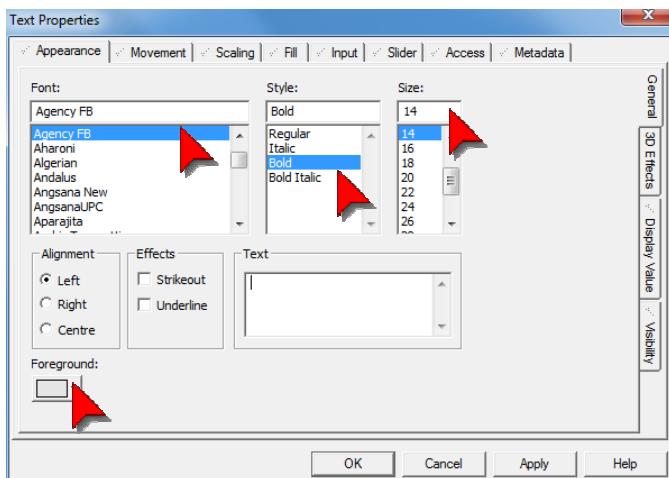
Click on the Toolbar and select the text tool once again.

Type in "Title".

Place your cursor below the EQUIPMENT title and click on the screen.

Select a font, make it bold and set the font size to 14.

Change the Foreground color to a light shade of gray.



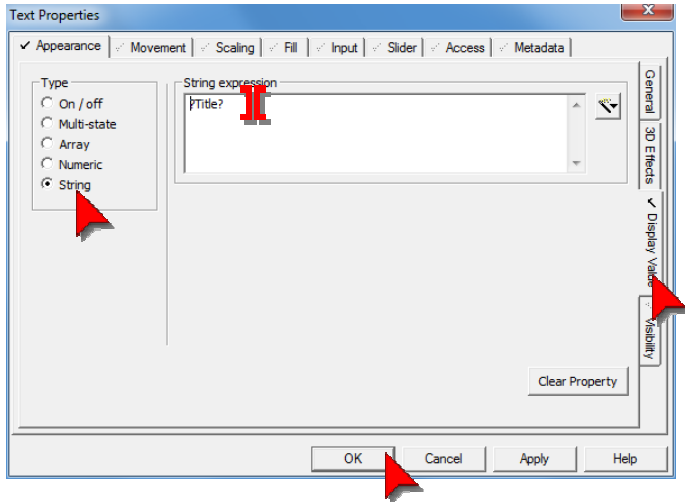
Click on the Display Value tab on the right. Choose the String option from the type menu.

Quickstart Tutorial V7.20

Addendum – Creating Supergenies continued...

Type in "?Title?" as your string expression as shown below. This will replace the initial text you typed when creating the text object.

Click OK.



Supergenies substitutions use named parameters inbetween question marks. When sending dynamic tags to the supergenie, they are assigned to these named parameters in runtime. This will be shown in the next chapter.



Select the Straight Line tool from the Toolbox.

Click on the left side of your page slightly below the Title text and holding the mouse draw a straight line to the right side of your page.

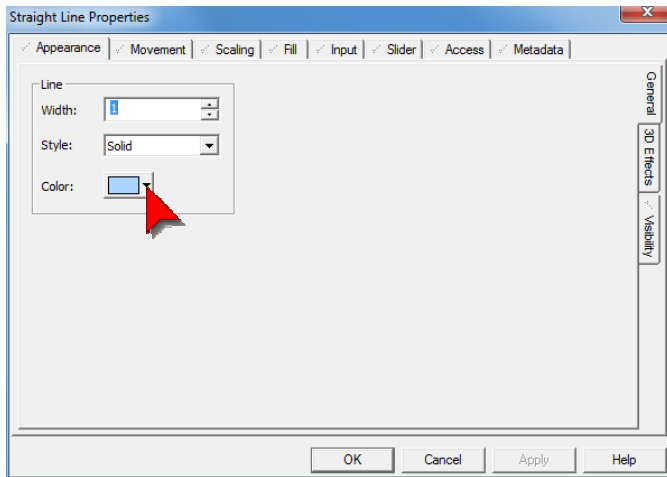
Change the color to a light shade of blue.

Click OK.



Quickstart Tutorial V7.20

Addendum – Creating Supergenies continued...

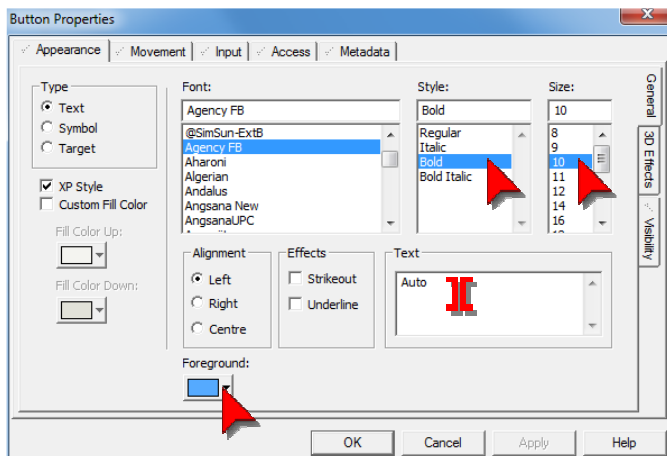


Now, we will replicate the same three controls for the pump on our super genie page.

Select the button tool from the Toolbar and draw a button below the line.

Type in "Auto" in the text field.

Choose a font, make it bold and adjust your size to your liking and set a color.



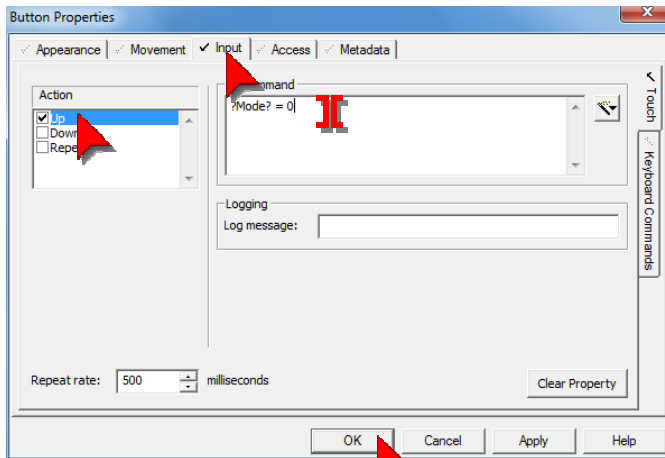
Select the input tab from the top menu and type in "?Mode? = 0".

Notice that we are simply replacing the tag names in the original Auto button with a parameter name.

Once we pass a tag as a parameter into the page, the tag name will replace the ?Mode? parameter.

Quickstart Tutorial V7.20

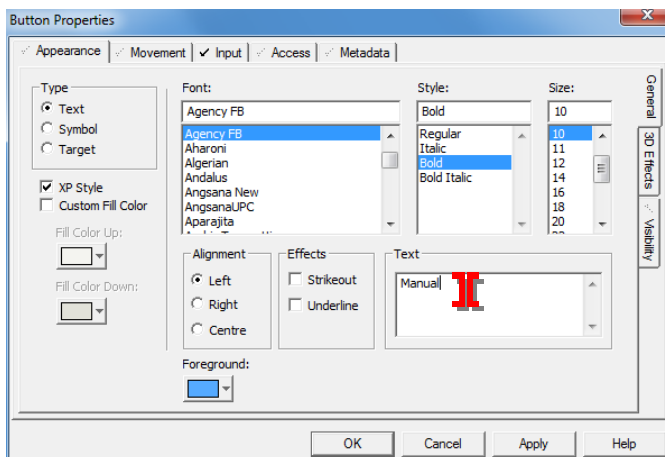
Addendum – Creating Supergenies continued...



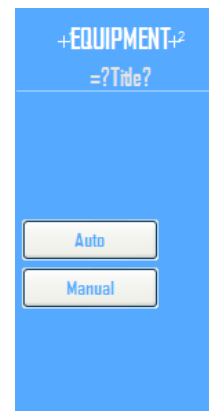
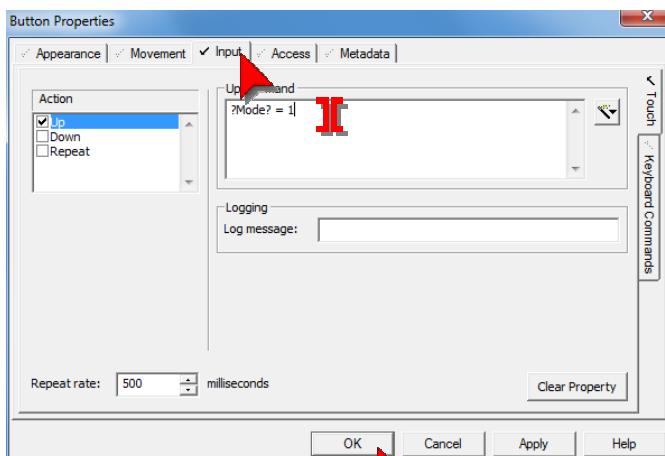
Click OK.

Copy the button you have just created and paste it.

Delete the text "Auto" and instead type in "Manual".



Go to the input tab and replace 0 with 1, then click OK.



Quickstart Tutorial V7.20

Addendum – Creating Supergenies continued...

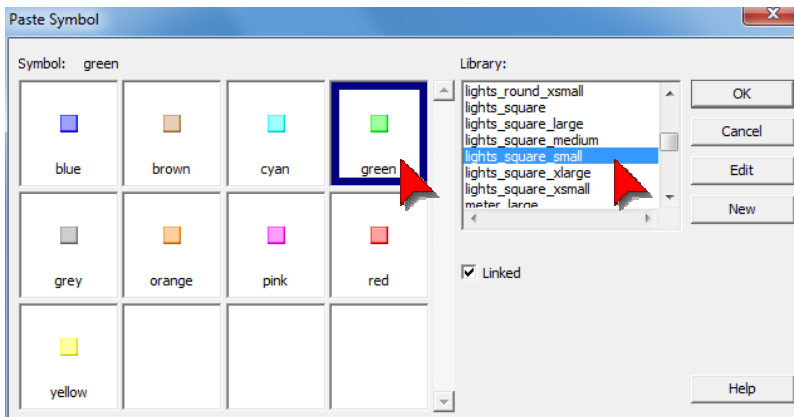
We have successfully replicated our Auto and Manual buttons. Now we need an indicator to show which mode is currently active. This time, however, our lights won't change color when a certain mode becomes active. They will instead disappear and appear depending on the currently active mode of our equipment.



From the Toolbar select Paste Symbol.

Scroll down and click on lights_square_small library.

Double-click on the green square.

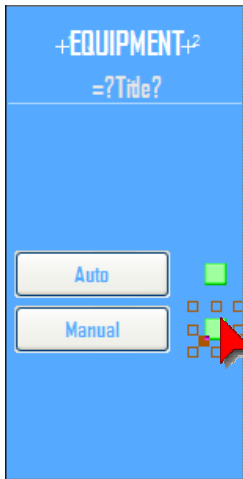
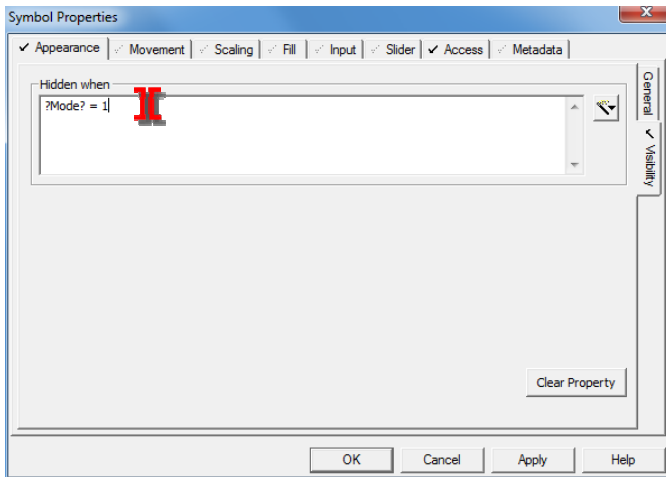


Select the Visibility tab from the right menu and type in "?Mode? = 1".

This will make sure that the green light remains hidden when our equipment is in manual mode.

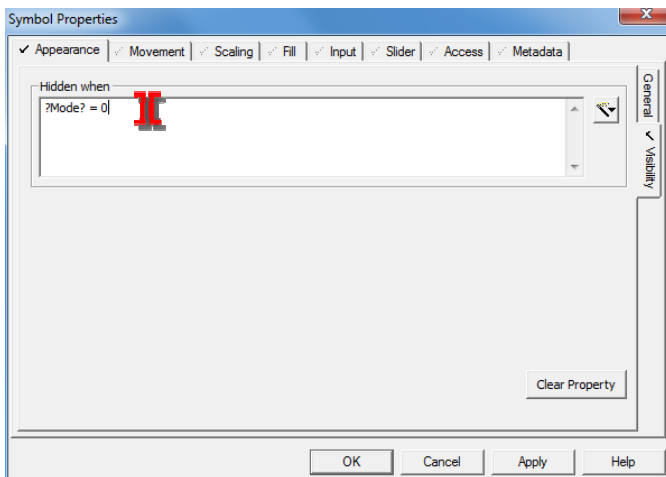
Quickstart Tutorial V7.20

Addendum – Creating Supergenies continued...



Drag the green light next to the Auto button, then copy and paste it next to the Manual Button.

Double click on the copied light and select the Visibility tab from the right menu. Replace 1 with 0.



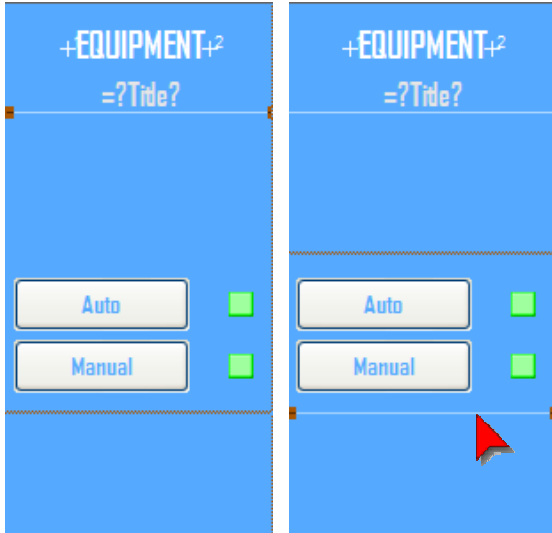
Click OK.

Quickstart Tutorial V7.20

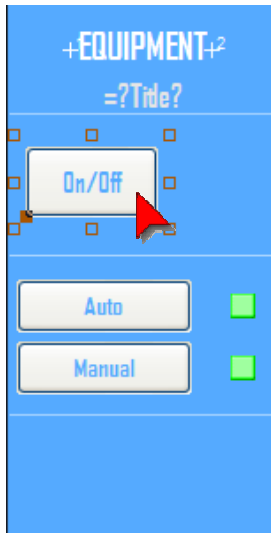
Addendum – Creating Supergenies continued...

Next, copy and paste the straight line under the Manual button.

Repeat this and paste another line above the Auto button as shown below.



Now, we will add another button to turn the pump on and off. This button will have exact same properties as the On/Off button we used on MyPage. We will however replace the tag name with a parameter to make it a generic button.



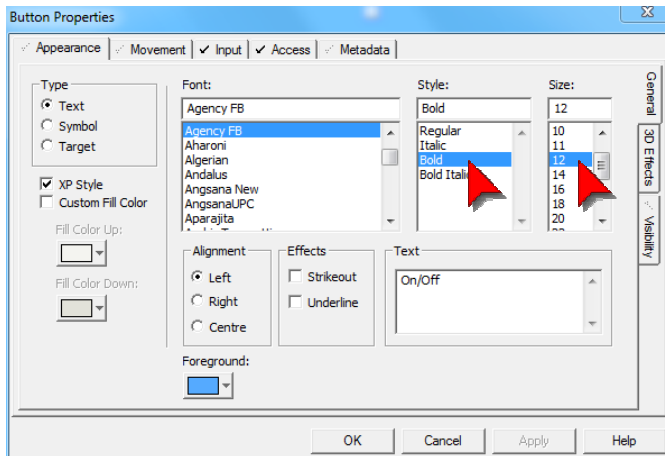
Simply copy the On/Off button from MyPage into your super genie page below the top line. Adjust its size and shape to suit your preferences.

Also make sure to leave room for a status indicator light on the right-hand side of the button.

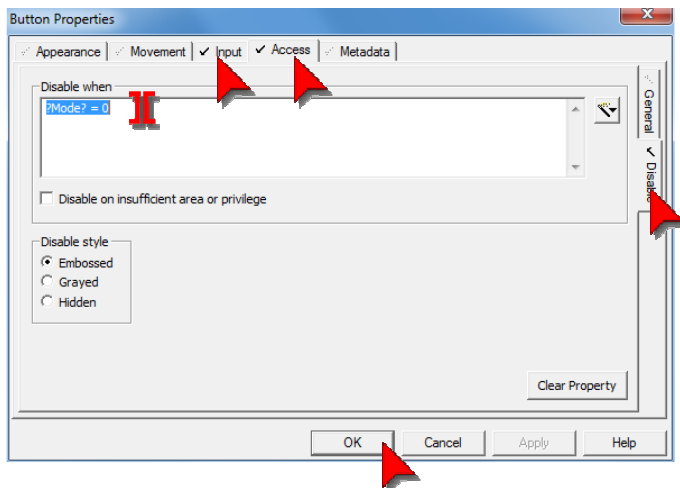
Next, double click on the button to open the properties screen.

Quickstart Tutorial V7.20

Addendum – Creating Supergenies continued...



Select Disable tab from the vertical menu on the right and type “?Mode? = 0”. This will ensure that whenever a tag associated with the name ?Mode? is passed to your super genie and its value reads 0, the On/Off button will remain disabled.



Select the Input tab, and modify this to toggle the ?Run? parameter. When you are finished click OK.



We will now place a status indicator light next to our On/Off button. Select the SymbolSet tool from the Toolbar and click on the screen.

Type in the condition “?Run? = 1” in the textbox.

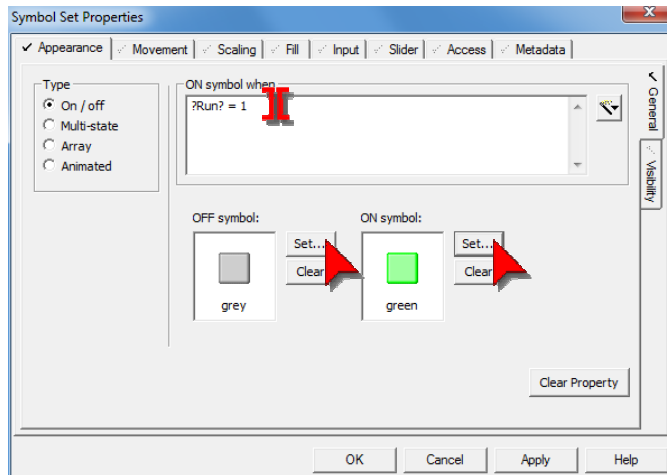
Click on the Set button next the Off symbol box and scroll down and select Square_lights_medium library. Pick the grey square light and click OK.

Repeat this process for the On symbol and this time choose the green light.

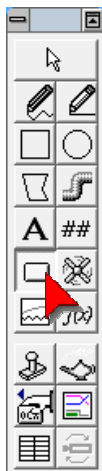
Click OK to apply your changes.

Quickstart Tutorial V7.20

Addendum – Creating Supergenies continued...



We have successfully replicated all three control buttons from the MyPage screen to control our pump. We will use this page as a popup screen, so we need a button to close this window once we no longer need it.

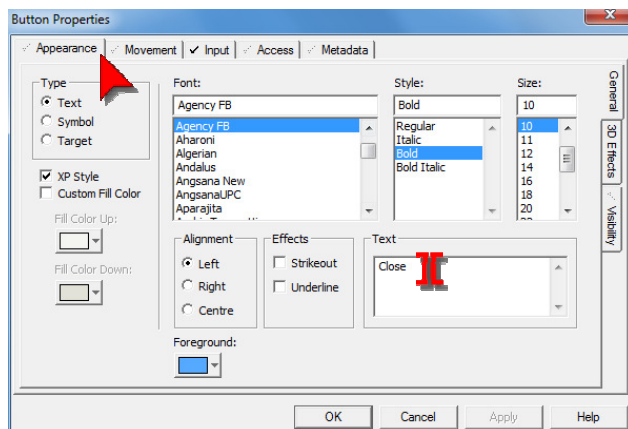


Select the button icon from Toolbar.

Draw a button inside the empty space below the bottom line.

Choose a font, set your style to bold and the size to 10.

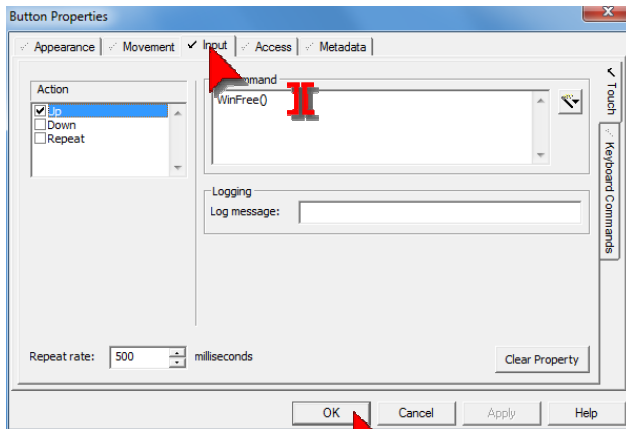
Chose your foreground color and type "Close" inside the text box.



Choose the Input tab from the horizontal menu at the top and type in "Winfree()". This function will close the window that this button is located once clicked.

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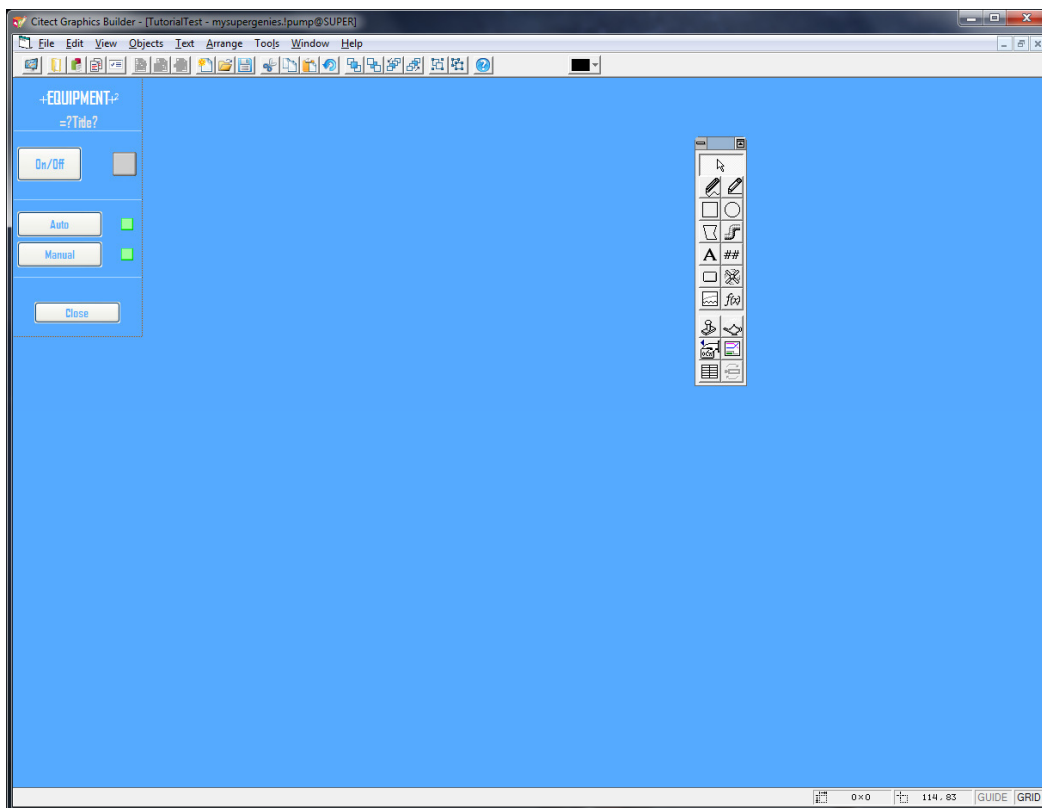
Addendum – Creating Supergenies continued...



Click OK.

This is how your screen should look after you have completed these steps.

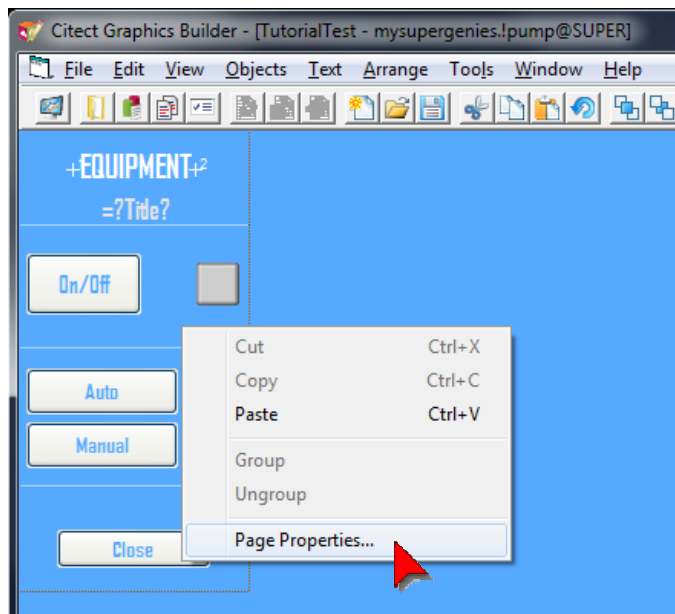
At the moment, we haven't defined the tag relationships (called associations) the super genie page will use. However we know that we have used three place holders while designing the graphical layout of our page: ?Mode?, ?Run? and ?Title?. We will now formalize these parameters in preparation of linking the Supergenies to a Genie.



Right-click at an empty location on the page and choose Page Properties from the menu (or select Properties from the File menu).

Quickstart Tutorial V7.20

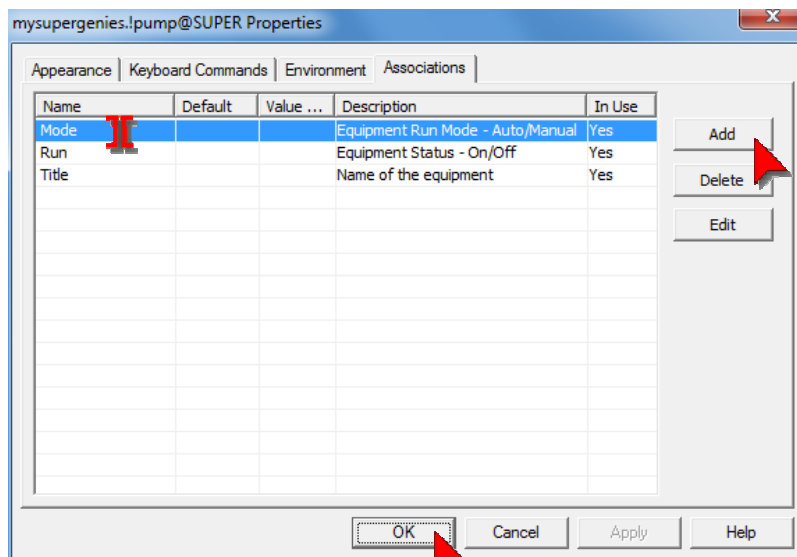
Addendum – Creating Supergenies continued...



Select the Associations tab from the top menu and click Add.

Type in "Mode" inside the name cell and give a description.

Repeat this for "Run" and "Title" .



Note that when we declare page associations for a super genie in the page properties, we do not place the name of the association between question marks.

Also notice that the In Use cell next to an association name will automatically indicate "Yes", if we have referred to that association anywhere on our page.

Once you declared those three associations, make sure that the In Use cell next to each one of them reads Yes. If an association you added is not in use, it means you have not successfully referred to that tag when creating your graphical objects. Follow the previous steps once again and make sure you have typed in the correct expressions.

We have created our first super genie. Click the save icon.

Quickstart Tutorial V7.20

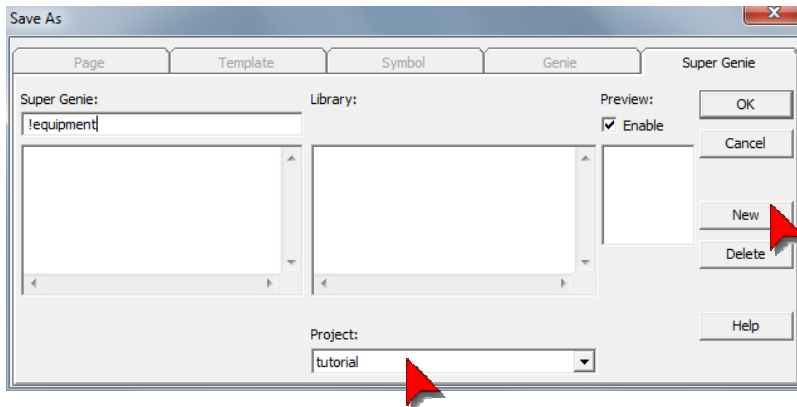
Addendum – Creating Supergenies continued...



When saving your super genies you can place ! in front of its name. This will ensure that your super genie remains invisible on run time and will not be listed as a page on the navigation menu.

If you do so, however, you won't be able to access it unless you define an event to specifically display the page or unless you attach it to a genie object.

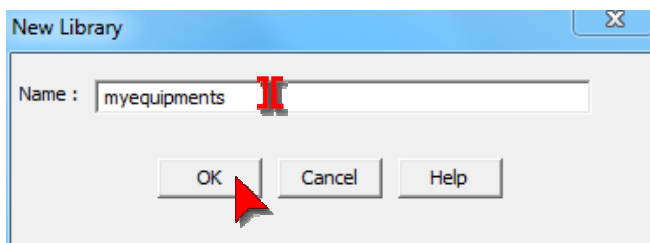
In the next section, we will see how you can attach a super genie to a genie object and display it at run time.



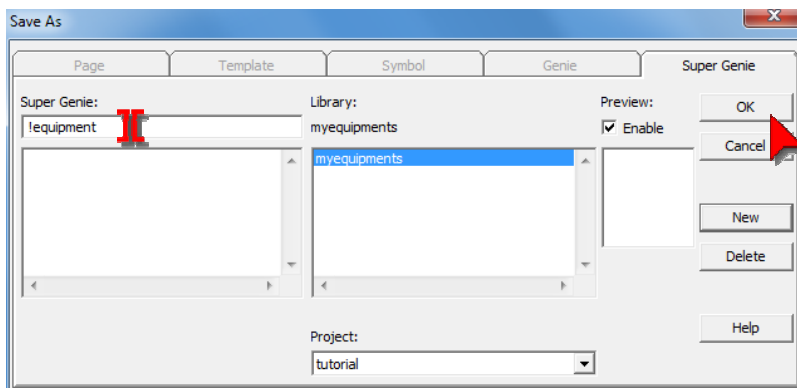
Genies and super genies need to be saved under a library. If this the first time you are creating a genie or a super genie, you won't be able to do so unless you have created a library first.

Ensure that the tutorial project is selected, then click on the New button.

On the popup page type in "myequipments".



Click OK.



Myequipment will now be listed under the library box.

Click on myequipment to select it. Give your supergenie that name "!equipment" and click OK to save.

Congratulations! You have created your first super genie. We now need to create a Genie to link tags dynamically with the Supergenie.


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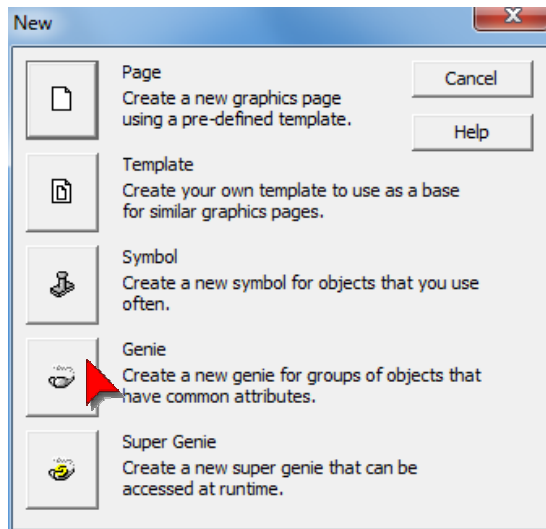
Addendum – Creating Genies

In this section we will learn how to create a Genie and attach the Supergenie to it.

Generally, we use genies to create generic equipment or animated graphical symbols which we can reuse multiple times on our pages. By doing so, we can create a single library object for a specific purpose with known properties and reuse it within our project many times without creating a new object each time.

Genies are linked from the master Genie so that any changes you make after you have used a Genie are automatically populated out across all instances on all pages in your project.

In Graphics Builder, click on the New Page  icon.



Select Genie on the popup page.



From the Toolbar select Symbol Set icon and click on the page to add a new object to the symbol.

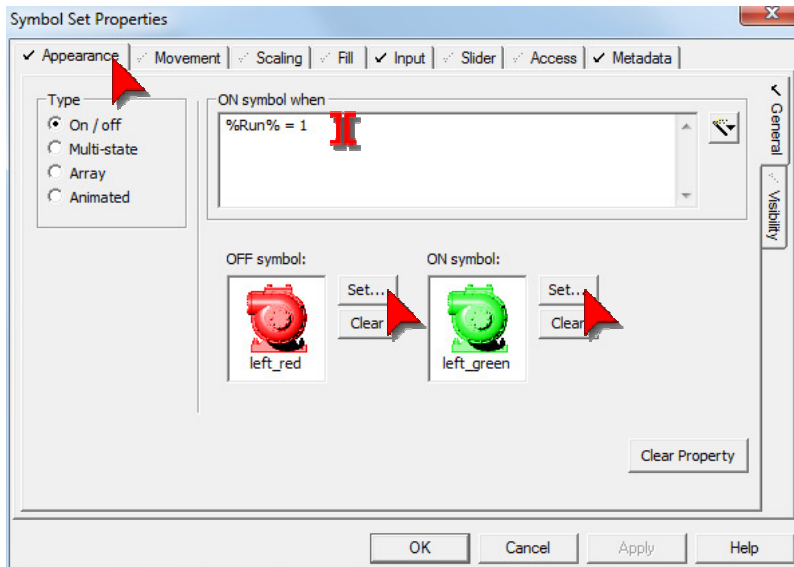
Set your OFF symbol by choosing the red base pump.

Repeat this for the ON symbol and this time choose the green pump.

Type in "%Run% = 1" as your ON expression.

Quickstart Tutorial V7.20

Addendum – Creating Genies continued...



Click on the Input tab from the horizontal menu above.

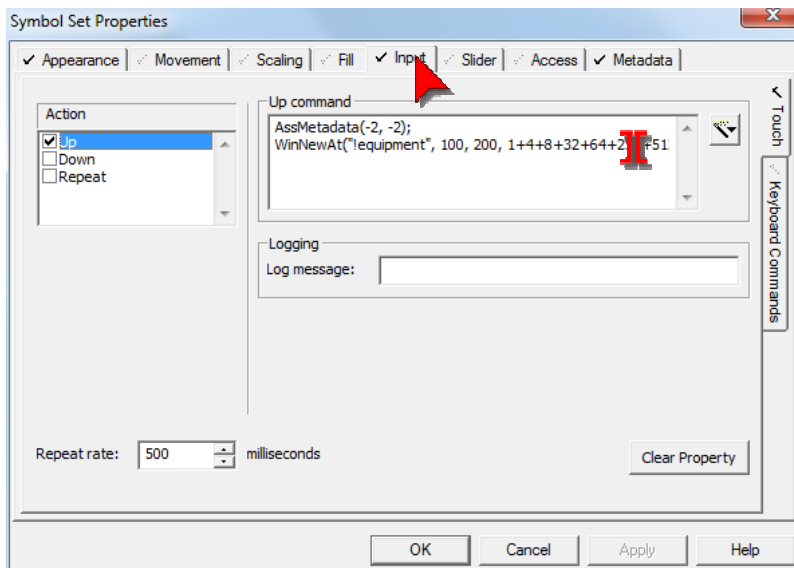
First, type in "AssMetadata(-2, -2);"

On the next line, type in "WinNewAt("Iequipment", 100, 200, 1+4+8+32+64+256+512, "MyCluster");"

TIP

Many 'mode' parameters in Cicode functions are based on unique bit combinations in data words. These can be expressed either as a sum of the various values, or you can list out the explicit values in a sum expression as shown here.

Listing out the values makes it easier to cross-reference the values to determine exactly which modes have been selected.



AssMetadata function will perform the required super genie associations using the tags or expressions we define when we first use your genie object on a page. The first parameter (-2) specifies that the next window or page displayed will receive the associations from the genie.

WinNewAt function displays a new window. First parameter defines the name of the page – in this case, a super genie – we want to display. Next two parameters are the X and Y coordinates, respectively, where the window or page will be displayed on the screen. The parameter that follows the X and Y coordinate values is used to determine the window properties. Refer to the online help to see different window options to be used with the WinNewAt function. The last parameter is the (optional) cluster name.

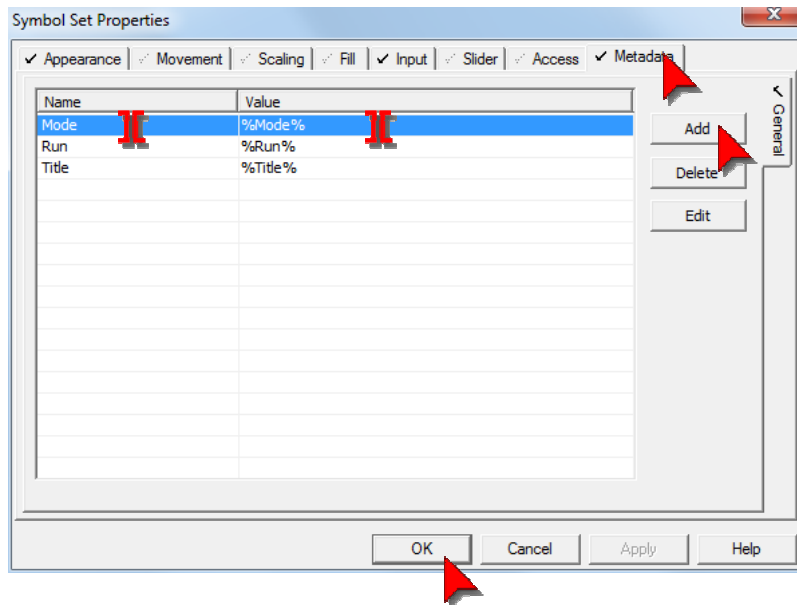
Quickstart Tutorial V7.20

Addendum – Creating Genies continued...

Next, select the Metadata tab from the top menu.

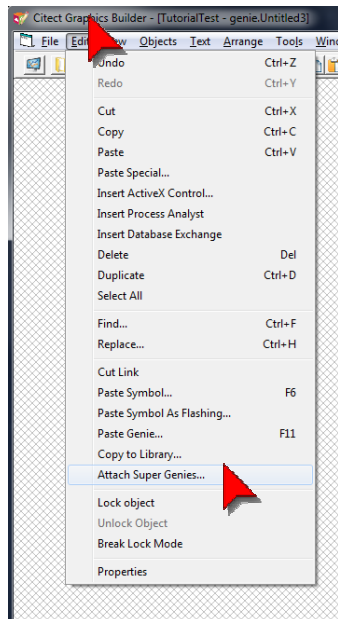
Click Add and type in “Mode”. Inside the Value cell, type in “%Mode%”.

Repeat this for “Run” and “Title”. Note that for Genie placeholders we use % instead of the Supergenie ? parameter delimiters.



Click OK when you are finished.

Now we will attach the super genie we created in the previous exercise. Attaching a SuperGenie allows the page to be referenced in your project when the associated Genie is used from the library. Associations to defined tag relationships can also be used on any page in your project.

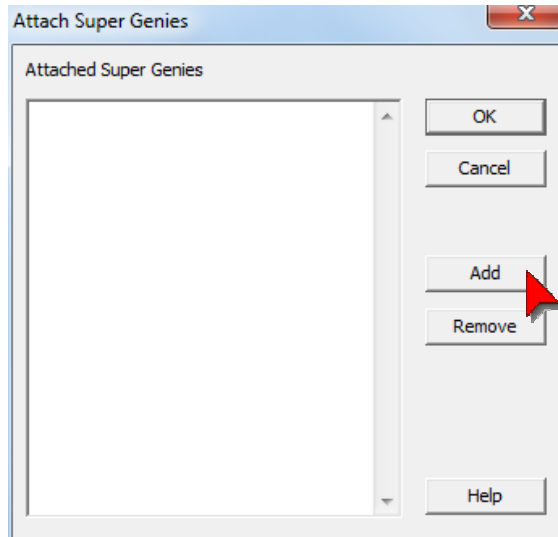


Click on Edit menu and select Attach Super Genie.

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Addendum – Creating Genies continued...

On the Attach Super Genie popup screen, we will see that our genie has no super genie attached to it.

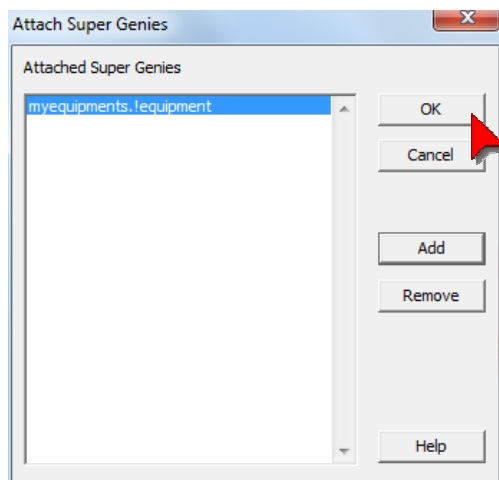
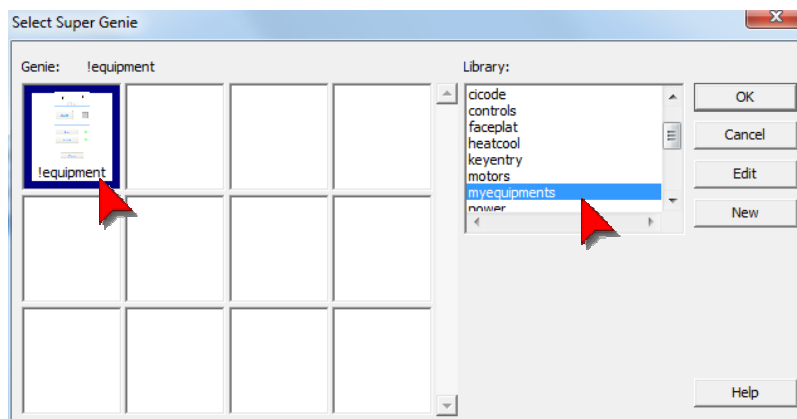


Click on the Add Button.

Scroll down and select myequipment library by clicking on it.

You should now be able to see the !equipment super genie on the left hand side.

Simply double click on !equipment.



You should now see myequipment.!equipment on the list of attached super genies.

Note that you can attach more than one super genie to a genie object for additional functionality if you desire.

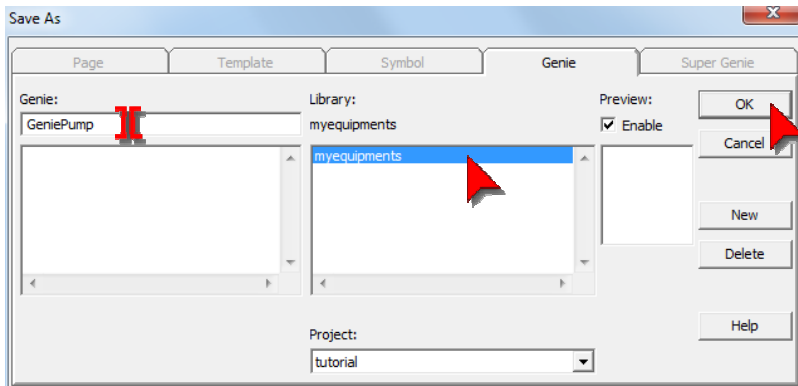
Click OK.

Quickstart Tutorial V7.20

Addendum – Creating Genies continued...

We have successfully created our first genie and attached the super genie page to it. Now, every time we click on the genie object, the super genie page will popup and all the metadata we link to our genie object will be passed to super genie page as associations.

Click on the Save  icon to save your genie.



Type in "GeniePump" as its name and select myequipment library.

Make sure the project is set to Tutorial.


Click OK.

Now we have created our genie object and linked it with our super genie page, we will take a look at how to use these objects on the page we have previously designed.

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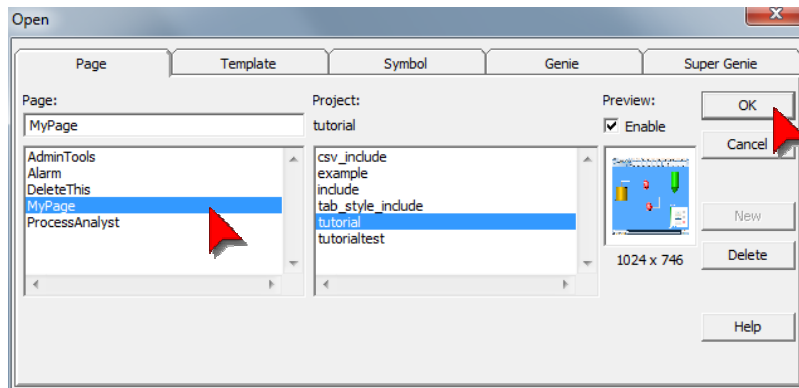
Addendum – Using Genies on a Page

We will now place our genie object into your MyPage screen.

Inside the Graphics Builder, if you don't already have your MyPage screen open, click on the  (Open) icon.

Select tutorial as your project.

Double click on MyPage to display the page.



Now, it's time to place a GeniePump on to the page, which will eventually replace the old pump.

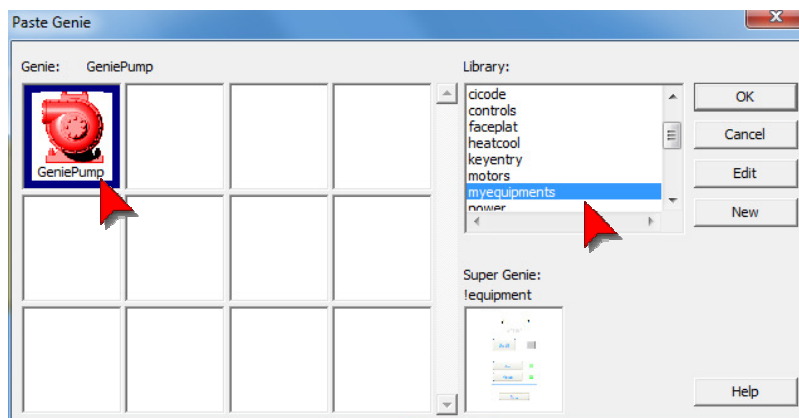


Select the genie icon from the Toolbar.

Scroll down and select myequipment library from the Library list.

You should see the GeniePump object on the left hand side.

Simply double click on it to select the genie.



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Addendum – Using a Genie on a Page continued...

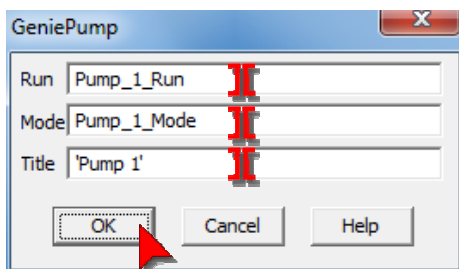
You will be presented with a popup window which prompts you to enter the Genie tags to be used for each of the three parameters used on the Genie.

On this window, you should see all the metadata fields we have declared when creating our genie object. We will now enter the desired variable tag names in the empty fields.

To link the variable tag Pump_1_Run to the run Metadata, simply type in the tag name inside the field.

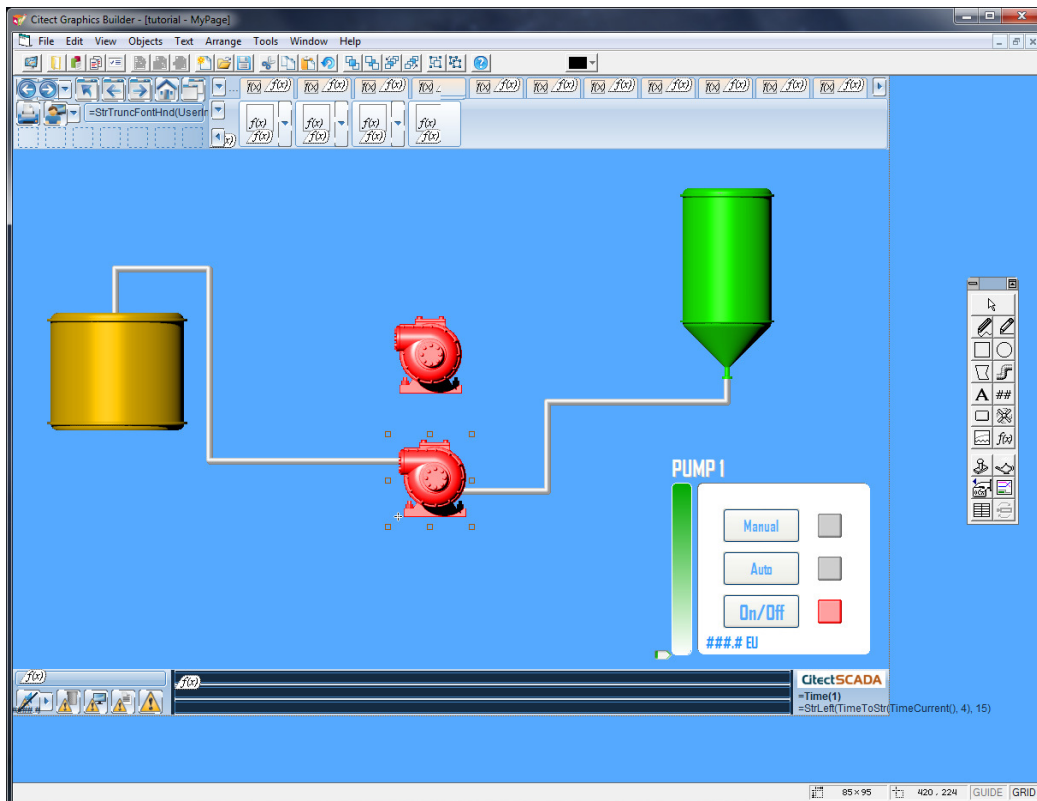
Link your Pump_1_Mode tag to the Mode metadata of your genie object.

For the Title metadata, type in the static text “Pump 1” inside single quotes. Genie associations don't need to be tags, they can be text string or numerical replacements as well, but they must have single quotes around them to allow Citect to recognize them as such.



Notice that Title metadata is linked with a constant string expression 'Pump 1'. This is because we do not need to use a variable tag for the title.

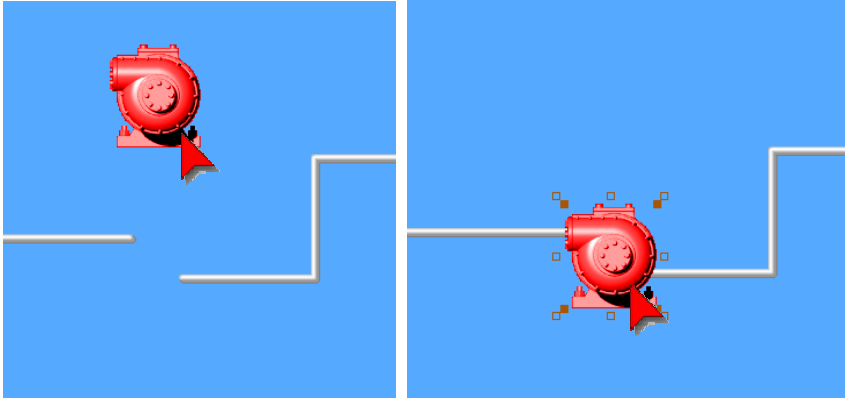
If you do not place an expression inside single quotes when linking your metadata, CitectSCADA will look for a tag with the specified name and if no tags are can be found, you will not be able to see the association on your Supergenie page at runtime. More importantly, if you forget to place your string expression inside single quotes and it happens to be the name of an already declared tag, you will see the value of the tag instead. Your page should now look like this:



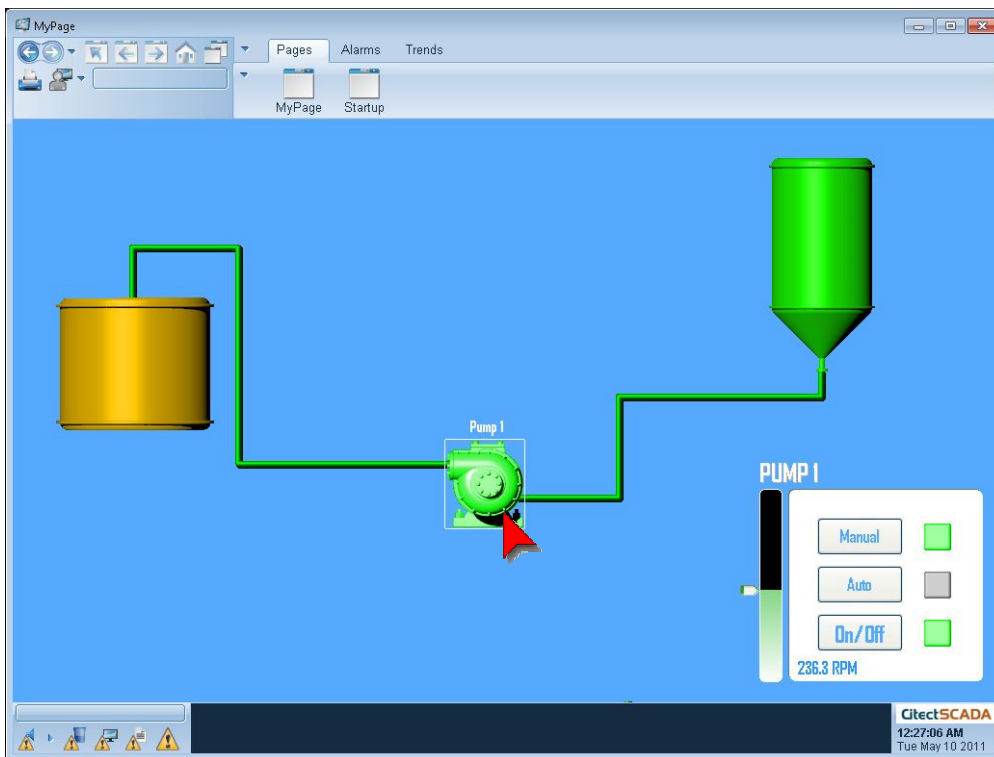
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Addendum – Using a Genie on a Page continued...

At the moment, we have two pumps on our page. One is the genie object and the other is the static pump we initially created. We no longer need the static pipe object, so click on it and press delete from your keyboard. Hold and drag GeniePump to its place to replace it.



Save your project by clicking the save icon and then click on compile button and run your project.



You will notice when you turn Pump 1 On and Off from the menu on the bottom right corner, GeniePump will change its color.

Now we will see how to make use of our super genie page.

You will notice that when you hover your mouse over GeniePump, it will be surrounded by white borders. This indicates that you can click on the object.

Click on the GeniePump now.

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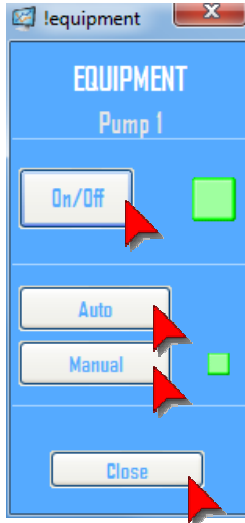


TIP
You don't have to link Genies with Supergenies. Genies can be used on their own for items which don't require popups to be associated with them.

You can also display SuperGenies from CiCode without linking them through Genies.

Addendum – Using a Genie on a Page continued...

Your !equipment super genie page will appear.



You should now be able to control the status of Pump 1 directly from the popup window.

Click on the On/Off button to toggle between its run modes.

You can also press the Auto or Manual button and the status indicators on MyPage will update instantly to represent its new state.

Once you have finished testing your super genie page, click the Close button.

Congratulations. You have now completed building a Genie and its associated Supergenie.

If you're feeling adventurous you can add new tags for another pump (eg. Pump_2), and paste another Genie onto the page. The steps are:

1. Add the Pump_2 tags to the tags list in the Project Editor
2. Paste another genie onto the page
3. Compile and restart your project

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Addendum – Tag Extensions

Another new feature in CitectSCADA V7.20 is the tag extensions. These are additional properties and methods that you can access for your tags. These include quality flags, quality timestamps, and override functions. For this exercise we will focus on the Tag Override method.

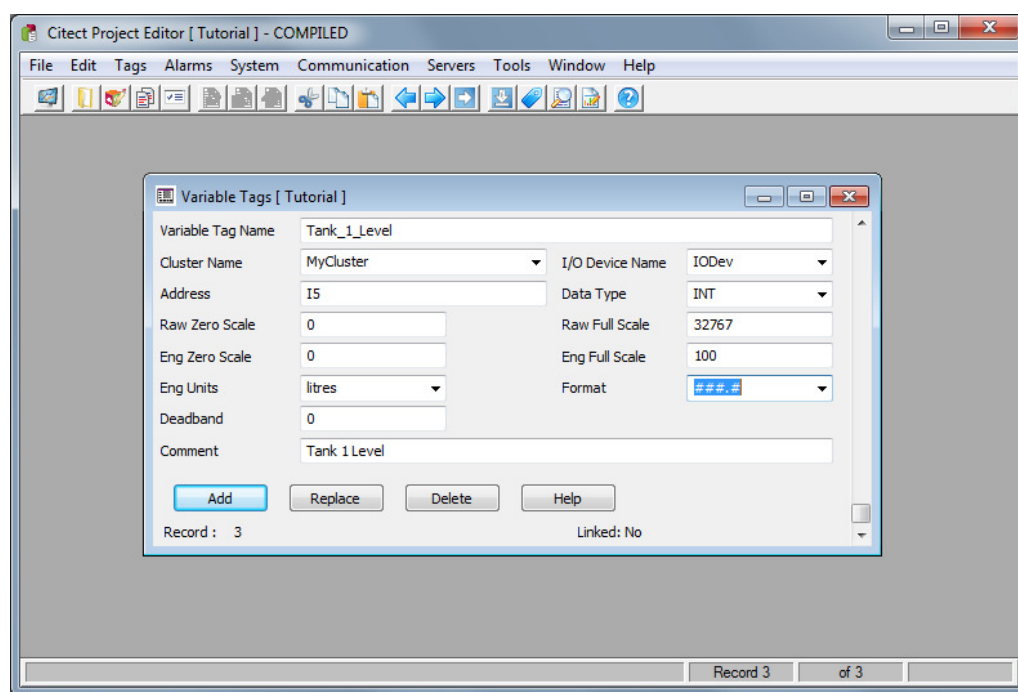
Tag Override allows you to set your tag's value to a different value than it is receiving from the field devices.

To illustrate how to use tag extensions and the override feature, we will define a new variable tag called Tank_1_Level.


Open your Project Editor and click on  icon to open the variable tag editor.

Type in "Tank_1_Level" for the new tag's name.

Fill in the rest of the information as it's shown on the screen below.



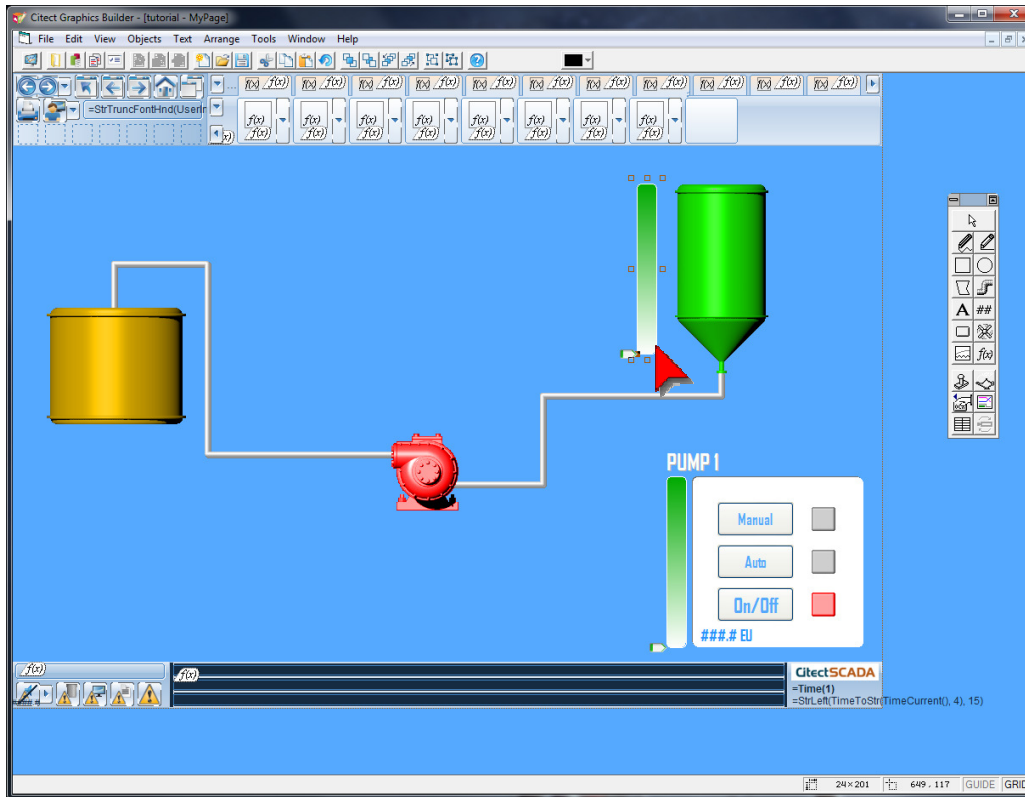
Click Add.

Next, click on the  icon to switch to your Graphic Builder.

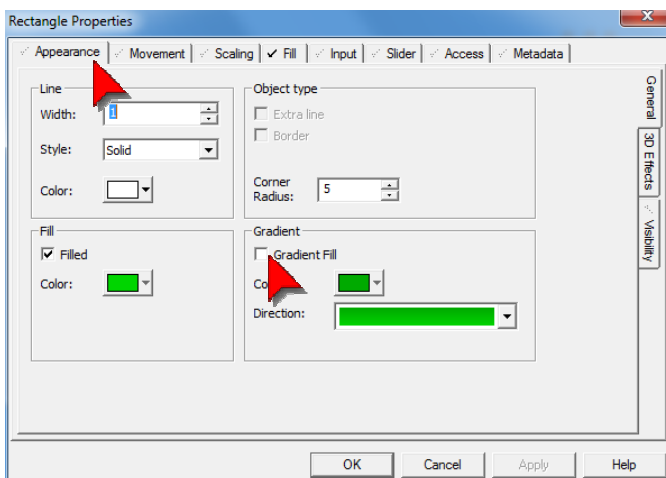
Quickstart Tutorial V7.20

Addendum – Tag Extensions continued...

Select the Pump 1 Speed indicator and slide controller, then copy and paste these items to the left of the source tank.



Access the properties on the new tank level indicator and access the Appearance tab. Click on the gradient fill tick box to uncheck it.



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Addendum – Tag Extensions continued...

Select the Fill tab, then the Level tab from the vertical menu. Select the Tank_1_Level tag to control the level fill indicator.

Double click on the slider.



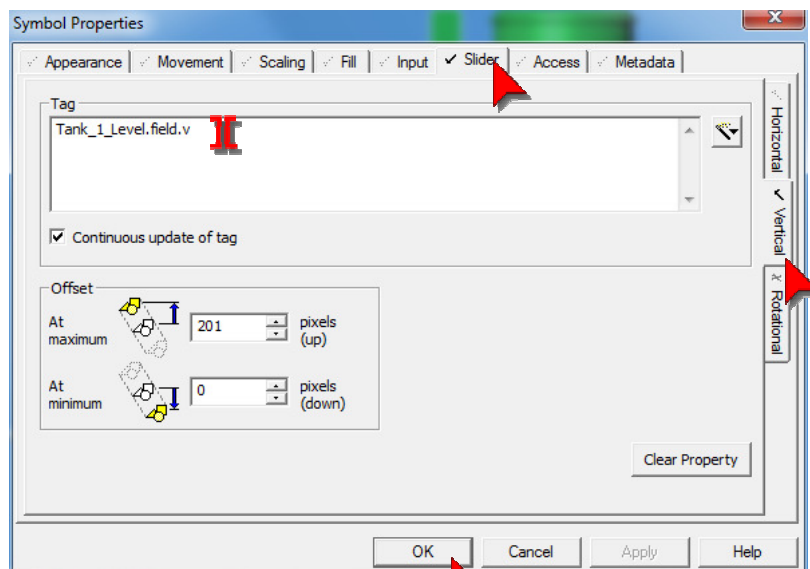
You can access other tag extensions adding a dot (.) after your tag name, followed by the property (or method) you wish to access.

Here Tank_1_field.v means the value (.v) of the field device (.field).

Click OK when you are finished. The indicator will show either the live field value, or the override value, depending on which mode the tag is in.

Next, select the Slider object and access its properties. Select the Slider tab from the top menu and then select the Vertical tab from the vertical tab menu.

Select the Tank_1_Level tag, then add the ".field.v" extension. This will configure the slider to always write to the field value (ie. From a field instrument, not the manually entered override value). This allows us to use the slider as a field device simulator irrespective of which mode the tag is in.



Click OK.

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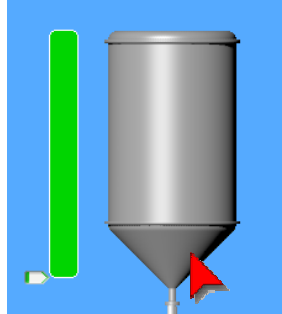
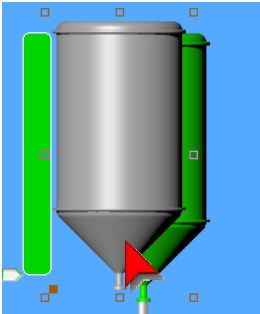
Addendum – Tag Extensions continued...

We will now add another tank into our screen.

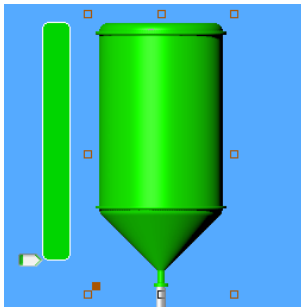


Click on the paste symbol icon from the Toolbar and select the same conical based tank you did earlier.

Click on the grey tank symbol holding the mouse button drag in on top of the previous tank to completely cover it.



Send the new tank to the back so that it now lies behind the original tank and is not visible on your page.



We will now configure the green tank to show the level by hiding a percentage of itself depending on the level. The static grey tank behind it will slowly become visible as the level drops.

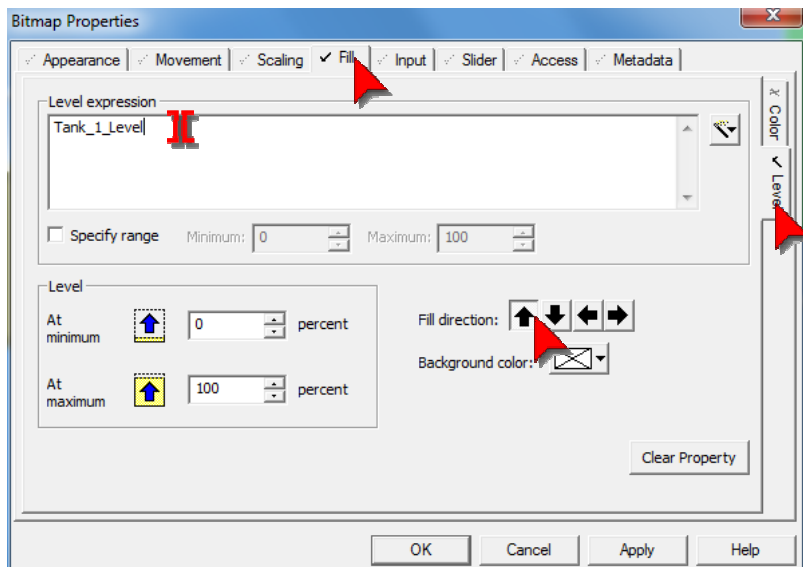
Double click on the green tank to open the properties window.

Choose the Fill tab from the horizontal menu on the top and then choose the level tab from the vertical menu on the right.

Type in "Tank_1_Level".

Quickstart Tutorial V7.20

Addendum – Tag Extensions continued...



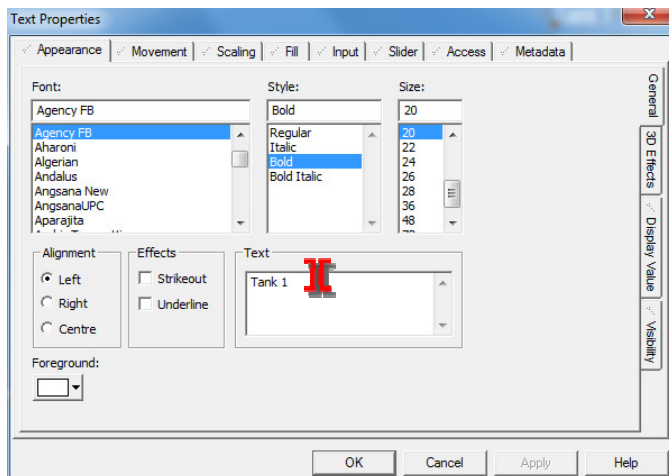
Click OK.

Let's us now place a label for our tank on the page.

Copy the text PUMP 1 and paste it above Tank 1.

Double click on the copied text.

Type in "Tank 1".



Click OK.

Quickstart Tutorial V7.20

Addendum – Tag Extensions continued...

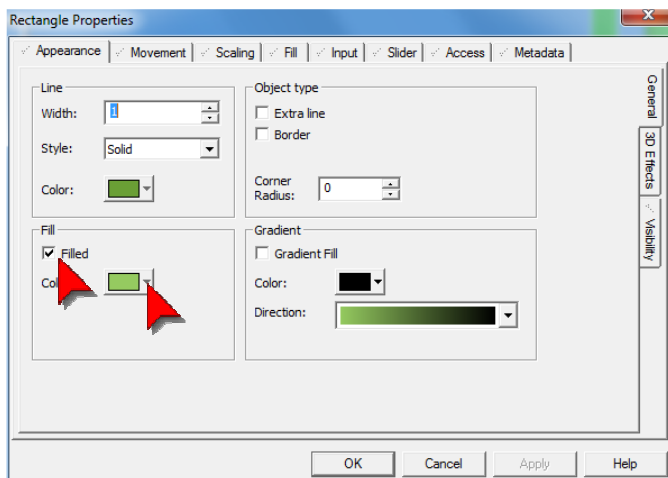
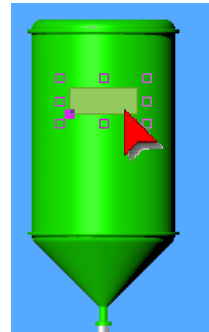
We will also use a numerical display to read the actual value of the Tank_1_Level tag.



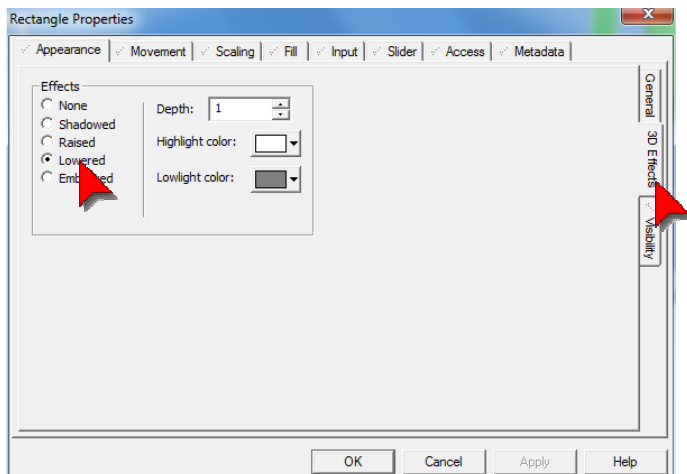
From the Toolbar click on the rectangle tool icon.

Draw a small rectangle on the green tank so that it sits in front of Tank 1.

Set your fill color. Make sure to pick a color that contrasts the bright green color of the foreground Tank as well as the grey of the background tank.



Select 3D Effects tab from the vertical tab on the right and choose the lowered option. Set your highlight color to white.



Click OK.

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Addendum – Tag Extensions continued...

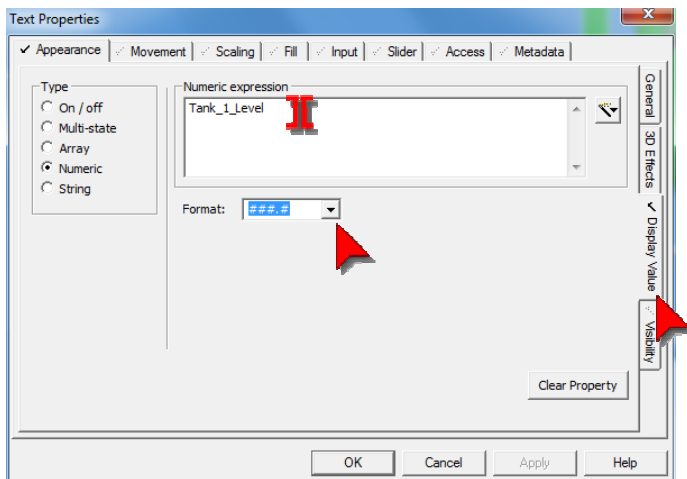
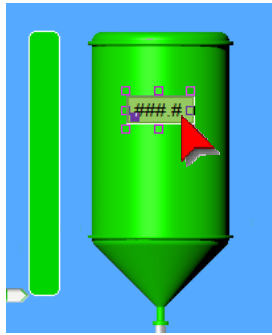


Click on the Number icon from the Toolbar.

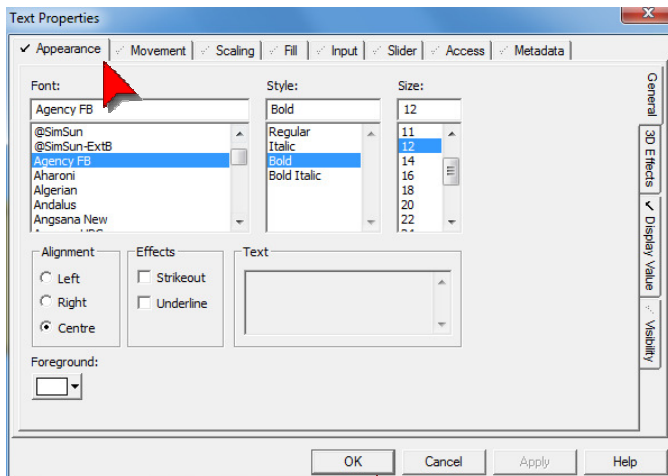
Then, click inside the rectangle to place your expression.

For your Numeric expression, type in "Tank_1_Level".

Pick ###.# format from the drop down menu.



Use the Appearance tab to set your display preferences then click OK.



Quickstart Tutorial V7.20

Addendum – Tag Extensions continued...

We will add two buttons to active and deactivate the override extension method for Tank_1_Level tag.



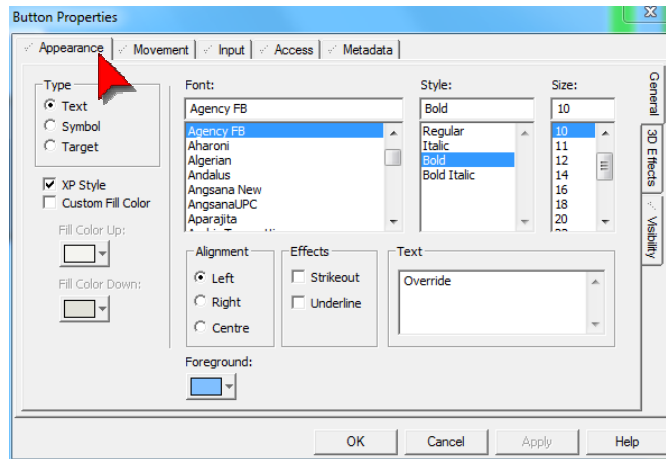
Click the Button icon on the Toolbar.

Draw a button above Tank 1.

Type in "Override" inside the text field.

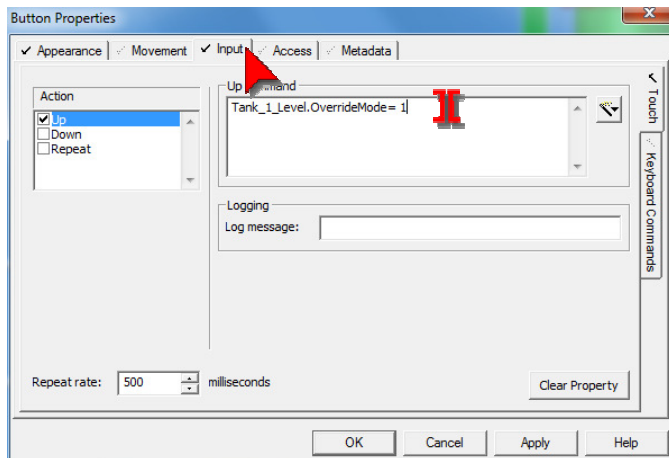
As usual, pick a font, set your Style to bold and set your font size.

Click Apply.



Unlike the On/Off button we used to control the Pump_1_Run tag, we will use two different buttons for each state. We will simply hide the button once the override mode of Tank_1_Level tag changes.

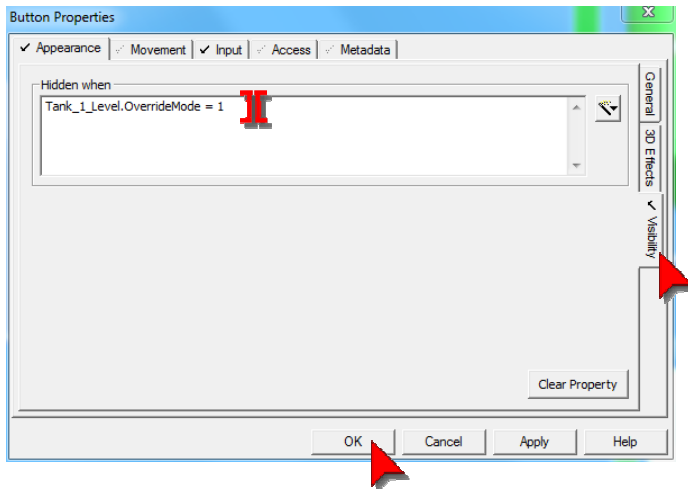
Click on the Input tab from the horizontal menu and type in "Tank_1_Level.OverrideMode = 1".



Select Visibility tab from the vertical menu and type in "Tank_1_Level.OverrideMode = 1".

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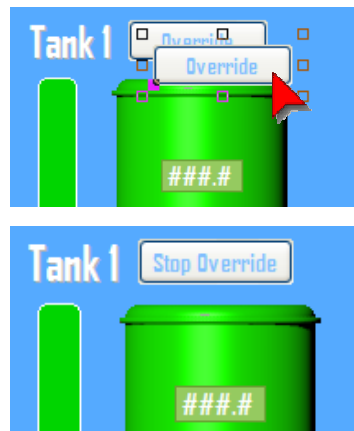
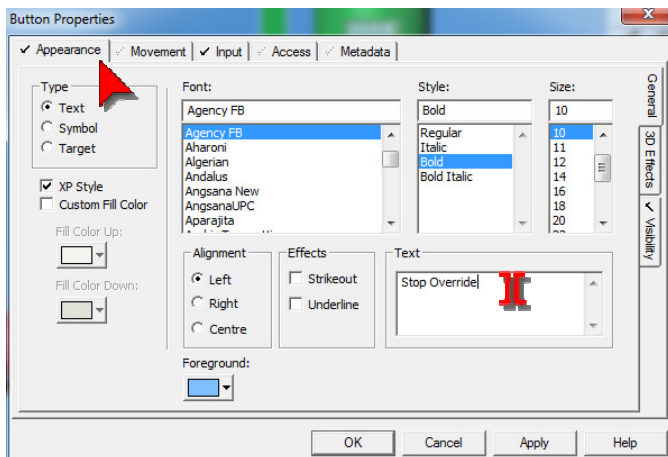
Addendum – Tag Extensions continued...



Click OK.

Copy the Override button and place the copy on top of the original.

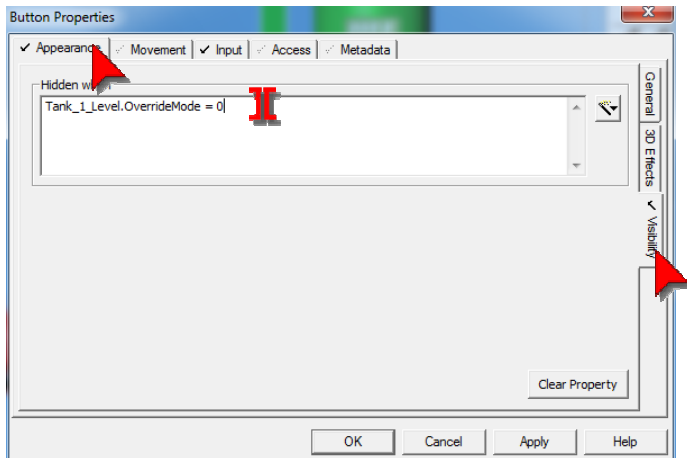
Double click on the button and replace the text with Stop Override.



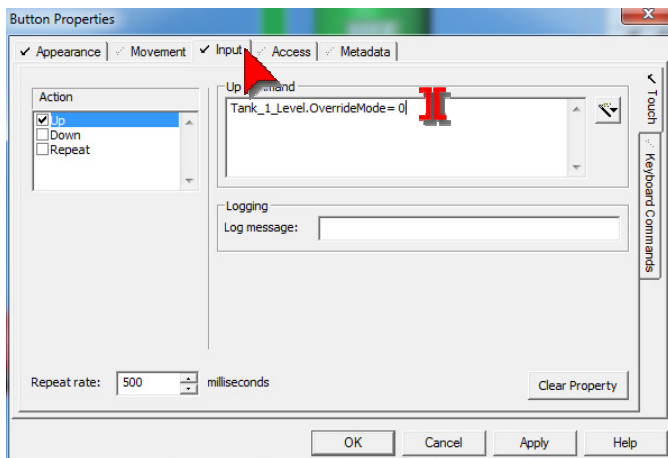
Select the Visibility tag from the vertical menu and replace 1 with zero.

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Addendum – Tag Extensions continued...



Click on the Input tab from the horizontal menu and type in "Tank_1_Level.OverrideMode = 0".



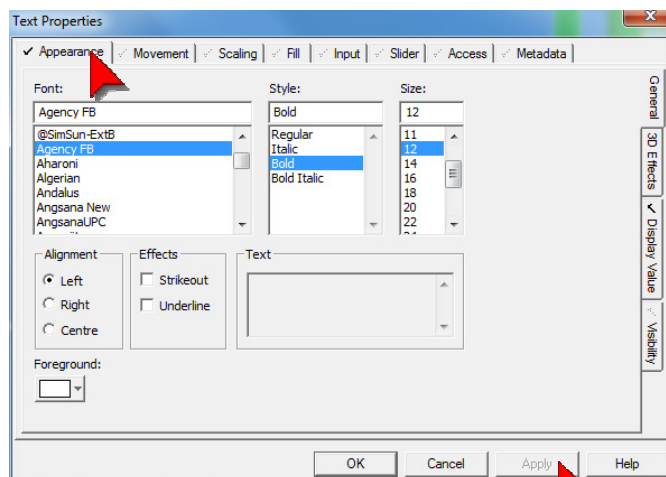
Using these override buttons we can toggle the override mode for Tank_1_Level tag. We also need to be able to set a value for the override mode. To do this, we will create an input field for the user next to our Override button.



Select the Number (##) tool from the Toolbar and click on the screen to place your expression.

Select a font, and set your style parameters.

Click Apply.



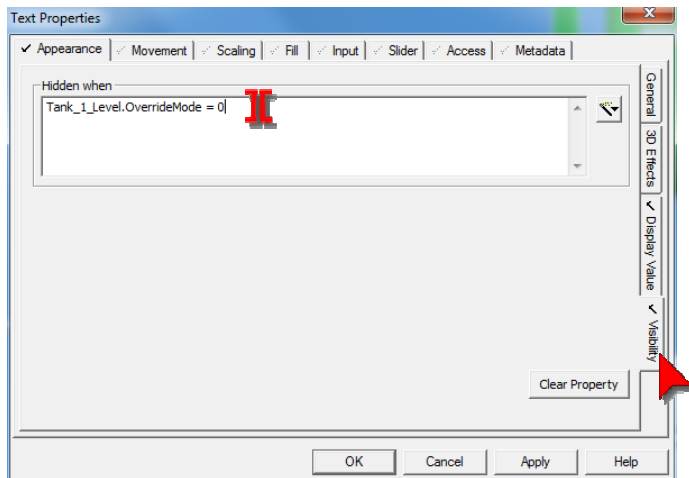
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Addendum – Tag Extensions continued...

We want the user to set an override value, only when the override mode is active. Therefore, we will keep the override value input field hidden when the mode is not active.

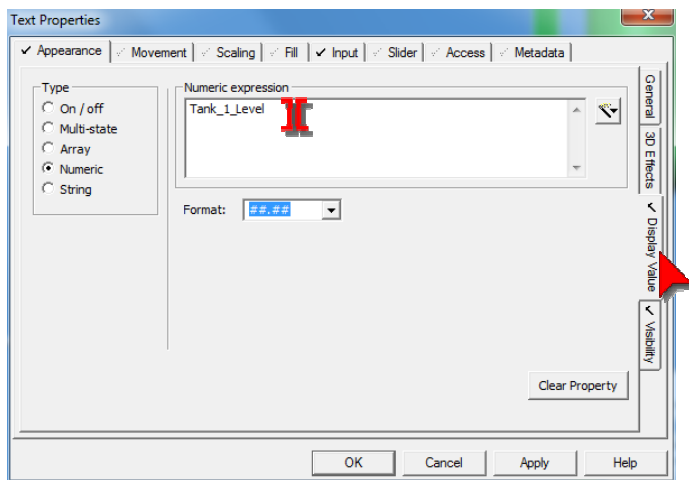
(Note, that if you set your override mode to 1 for a tag, every time you reactive (deactivate and activate again) the override value will be set to the tag value. For additional override modes, refer to your Help documentation.)

Select the Visibility tag from your vertical menu on the right and type in "Tank_1_Level.OverrideMode = 0".



Next, select the Display Value tab from the vertical menu. Type in "Tank_1_Level".

Choose ###.# for your format from the drop down menu.



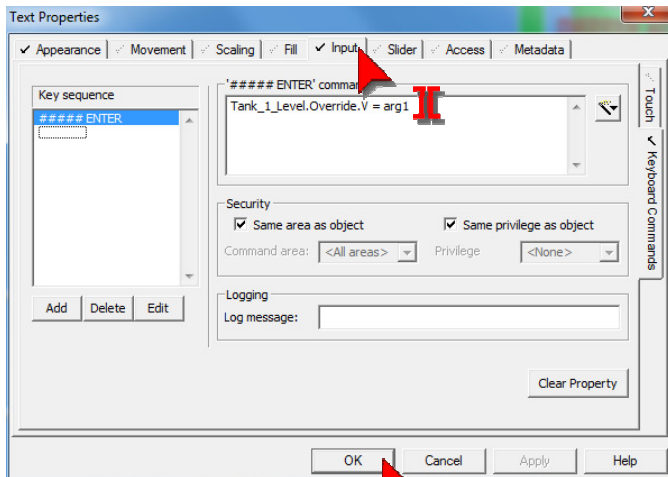
Click Apply.

We will use this numeric expression as an input field to set the override value when the mode is active.

Go to the Input tab from the horizontal menu and select Keyboard Commands tab on the right.

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Addendum – Tag Extensions continued...



Click the Add button and type in "##### ENTER" for your Key sequence. This will allow users to enter a number with 5 digits. Any one of the first four digits can also accept a decimal point (.) for input. For example, you can enter 46.24, .34, 100, etc.

Finally, for your Command expression, type in "Tank_1_Level.Override.V = arg1". Click OK when you are finished.

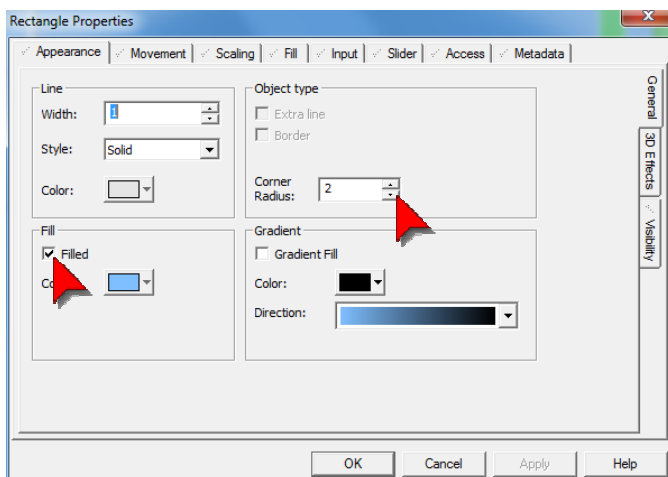
Note that the extension (.Override) allows you have access to an override value (.V), which we set to arg1 (the value the operator types into the keyboard).



Select the rectangle icon from your Toolbar and draw a box around the numeric expression.

Select a very light shade of grey for your border color. Then set your fill color to a light blue.

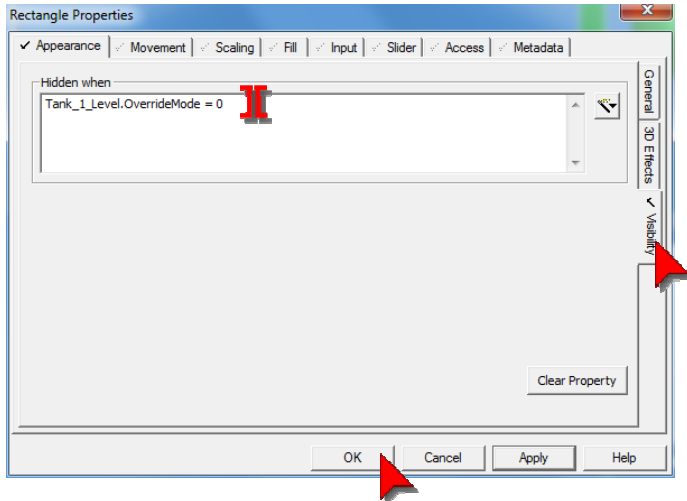
Set your corner radius to 2 to give it a distinct shape.



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Addendum – Tag Extensions continued...


Select the Visibility tag from the vertical menu and type inside the text field "Tank_1_Level.OverrideMode = 0".




Click OK.

This is how your Tank 1 should look like if you have correctly followed the previous steps.

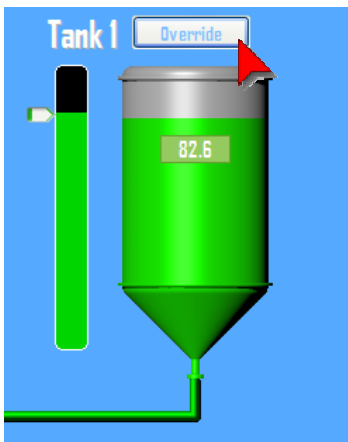


Save your project by clicking on the  button.

Press the  button to compile and run your project.

You can now set a value using the slider to adjust the tank level. When you drag the slider, both the level indicator and the fill effect on the tank will change. The numeric display on the tank will also change to display the latest value.

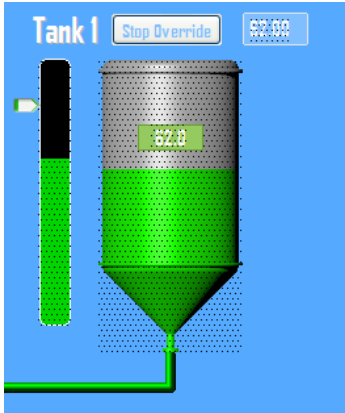
(Note that we set the slider to continuously update the tag value).



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Addendum – Tag Extensions continued...

Now click on the override button. You should see the Override button being replaced by the Stop Override button and the override value input field appearing on your screen. The Override input field should now read the same value as the display on your tank.



Once the override mode is activated, your slider will have no effect on the tank level, until the override mode is deactivated.

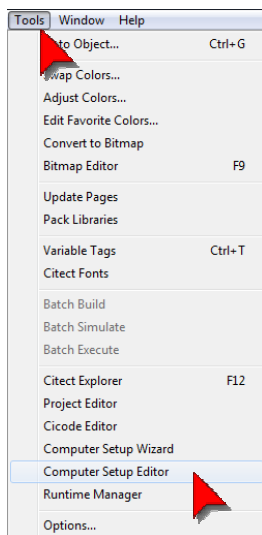
Now click on the override input field and enter a number then press Enter.

Both level indicators will represent the Override value, along with the number display on your tank.

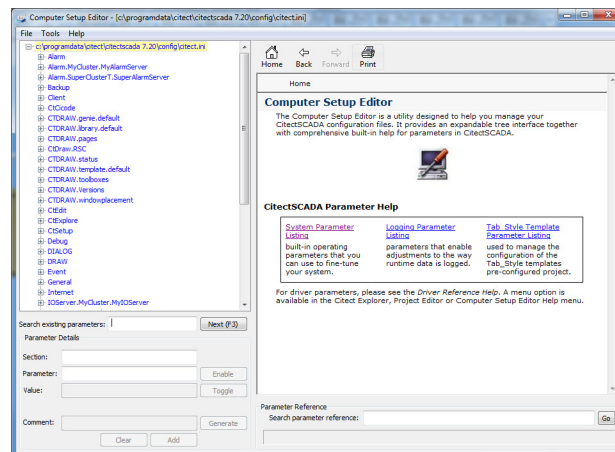
When you click on the Stop Override button, you will see the tank level returning to the field value (as controlled by the slider).

Every time you activate the override mode, you will notice a dithering effect over the graphical elements of your Tank. This is the default setting for tags in override mode. The purpose of dithering effect is to give users a visual indicator that the equipment is in override mode. However, this effect is the same as bad communications indication. So we will change this default setting and add our own override indication.

Switch back to the Graphics Builder.

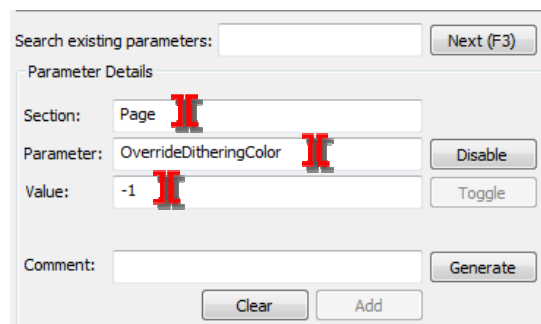


Select tools from the top menu and choose Computer Setup Editor.



Next, click on the Sector field and type in "Page". Click on the Parameter field and type in "OverrideDitheringColor".

Set your value to -1 to disable the dithering effect. Also make sure that that all other parameters under the Page section is set to -1 as well.



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Addendum – Tag Extensions continued...

Press Ctrl+S to save your changes and close the Computer Setup Editor.

With the dithering effect disabled, we need a clear visual indicator for the override mode.

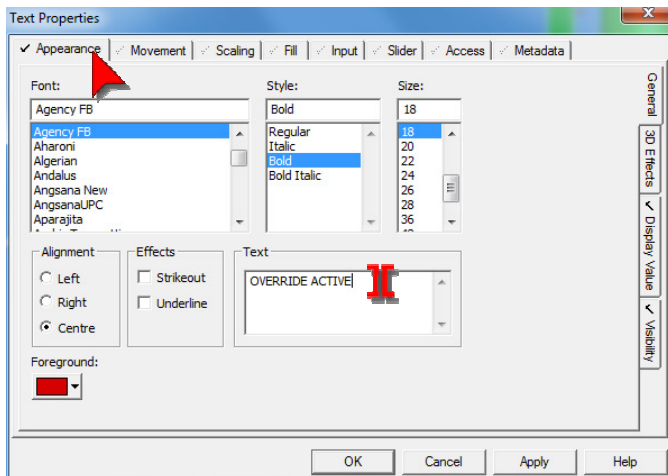


Go ahead and choose the text icon from the Toolbar.

Choose your font and set the style to bold. Pick a large size (e.g. 18) for your font.

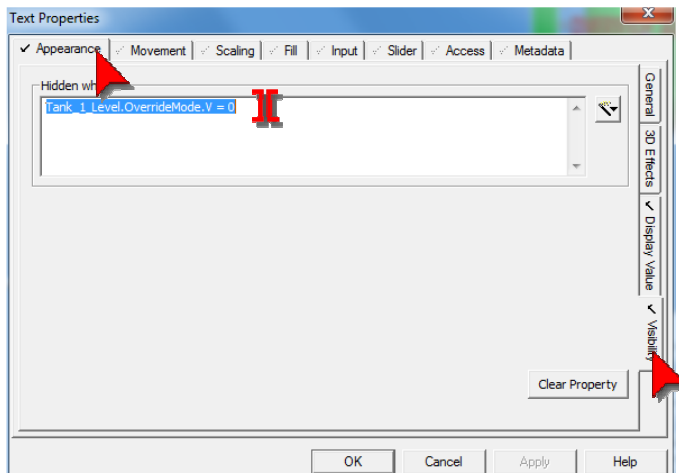
Type in "OVERRIDE ACTIVE" inside the text field.

Set your foreground color to red.



Select the Visibility tab from the vertical menu on the right.

Type in "Tank_1_Level.OverrideMode.V = 0" to hide the text when the mode is not active.



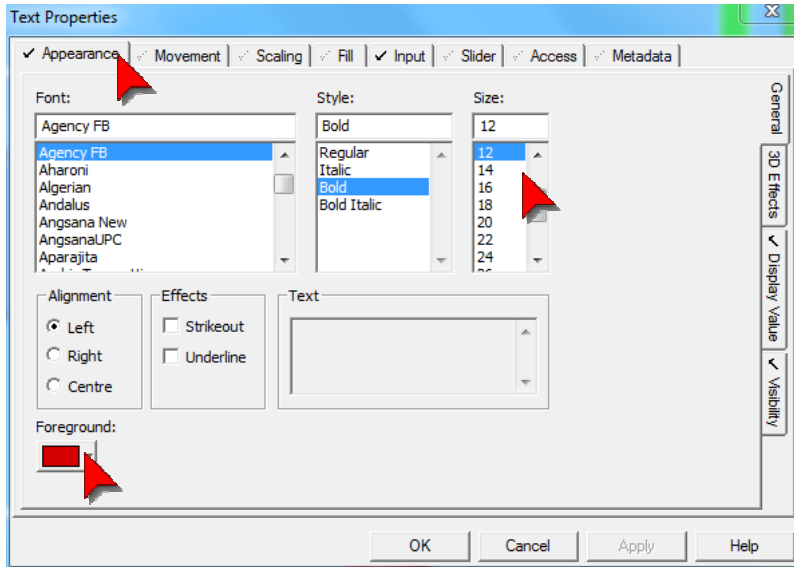
Click OK to apply your changes.

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Addendum – Tag Extensions continued...

We are almost done. The final step is to create a visual link between the OVERRIDE ACTIVE indicator and the override value input text field.

Simply double click on the numeric expression inside the override input field rectangle and set the foreground color to the same tone of red as the OVERRIDE ACTIVE text, then click OK.



Save your changes by clicking the  button and click on  button to run it.

