GENESIS64
From Sensor to HMI in Three Minutes

APPLICATION NOTE

August 2014

Description: Guide to connecting a sensor to an HMI using GENESIS64.
General Requirement: General knowledge of HMI development.

Introduction

This application note intends to let you explore the ease of configuring an OPC Unified Architecture SCADA/HMI solution in just a few minutes.

To connect to plant floor equipment, a tag will be configured in the OPC Server. Then, we will visualize this tag in GraphWorX64 and monitor it for alarms using AlarmWorX64.

Configure ICONICS OPC UA Server

To connect to real-time data sources you will use an OPC Server. If an OPC server is readily available and configured, skip to the next section: **Configuring a Process Point**.

If you need an OPC server, you can install the ICONICS OPC UA Server by Kepware from the **ICONICS OPC SERVERS v5.x** disk and choose the desired device protocol for your PLC or Loop Controller.

Once you have successfully installed the ICONICS OPC UA Server by Kepware, you will need to configure it.

1. Start the OPC server Configuration Dialog.
2. Select **Edit → Devices → New Channel** from the menu
3. In the New Channel Identification dialog, give this channel a name and click on Next.
4. In the New Channel – Device Driver dialog, select a driver from the list of available protocols and click on **Next**. This driver should be one that can communicate to the desired device.

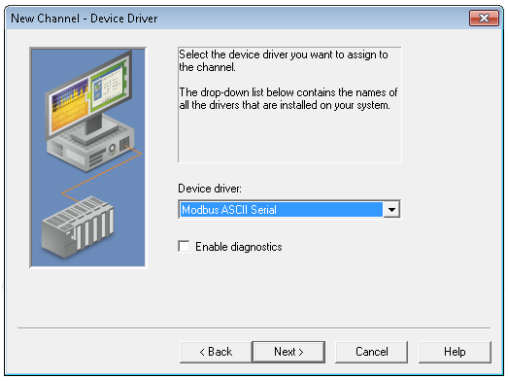

Figure 1 - Selecting the Modbus ASCII Serial driver

5. In the New Channel – Communications dialog, verify the communication port settings and click on **Next** until you can click on **Finish**.
6. Select **Edit → Devices → New Device** from the menu.
7. A New Device dialog comes up. Give the device a name and click on **Next** a couple times to display the New Device – ID dialog.
8. Verify the device node address (device ID) of the multi-dropped PLC.

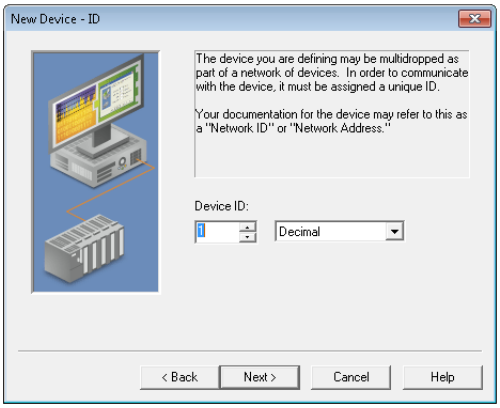

Figure 2 - Setting the Device ID

9. Click **Next** until you can click on **Finish** to complete the device setup.
10. Select **Edit → Devices → New Tag** from the menu.
11. In the Tag Properties dialog, specify a meaningful name for the tag, for instance **Temperature**, specify the **Address** of the register in the PLC where the temperature value is stored (for instance **400001**) and click on **OK.**

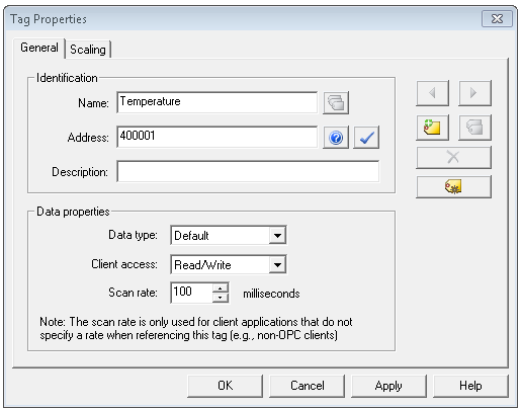

Figure 3 - Creating Properties for a Tag

NOTE: If you're not certain about the communication settings or the communication cable, please change the **Device Properties** to "**Simulate Device**" in order to get simulated sensor values for now.

12. Save the configuration and exit the UA server configurator.

Configuring a Process Point

Now that we have a tag in the OPC server, we can display it using GraphWorX64.

1. Go to Start → All Programs →ICONICS → GENESIS64 → GraphWorX64 → **GraphWorX64** to open a display.
2. On the **Dynamics** tab of the ribbon, click on the **Process Point** in the Text Objects section, and place it on the display. The Data Browser opens.

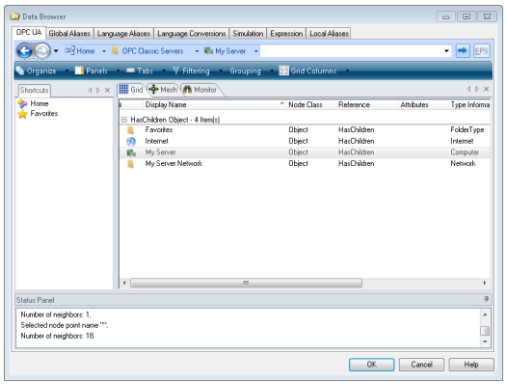

Figure 4 - Using the Data Browser to Select My Server

3. Select OPC Classic Servers, then My Server. Double-click on "ICONICS.IconicsOPCUAServer.V5" and drill down to your configured **Temperature** tag and click **OK**. Otherwise, you can select any tag from any OPC server of your choice.

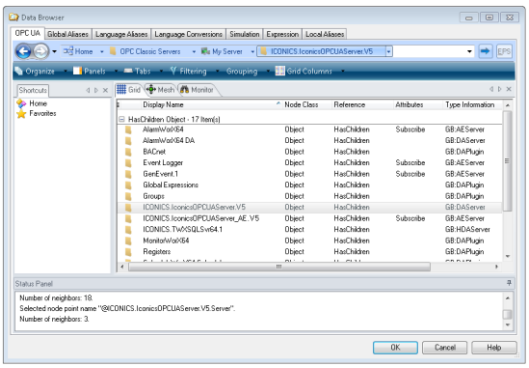

Figure 5 - Using the Data Browser to Select the ICONICS OPC UA Server

4. Once you have selected the data source for the process point, click on **Runtime** from the GraphWorX64 menu. The process point shows the actual temperature.

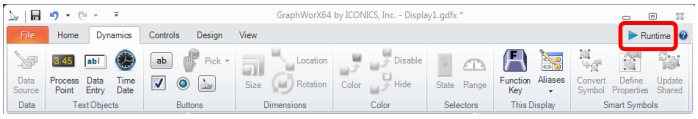

Figure 6 - GraphWorX64 Display into Runtime

NOTE: If you see **** on the screen, this indicates that the PLC is switched off, or the communication cable between the OPC Server and the PLC is unplugged. You can select a different tag that uses a simulated data source.

5. To add a bar graph indicating the temperature, you can click on **Configure** and select the Home tab of the ribbon.
6. Select the **Rectangle** button in the Shapes section; hold the left-mouse button down while you drag the mouse to draw a rectangle similar to Figure 7.
7. A right-mouse click will exit the drawing mode. If your rectangle is not currently selected, select it first before you click the RED color to repaint the object.
8. Select the **Size (** **)** action from the **Dynamics** tab.

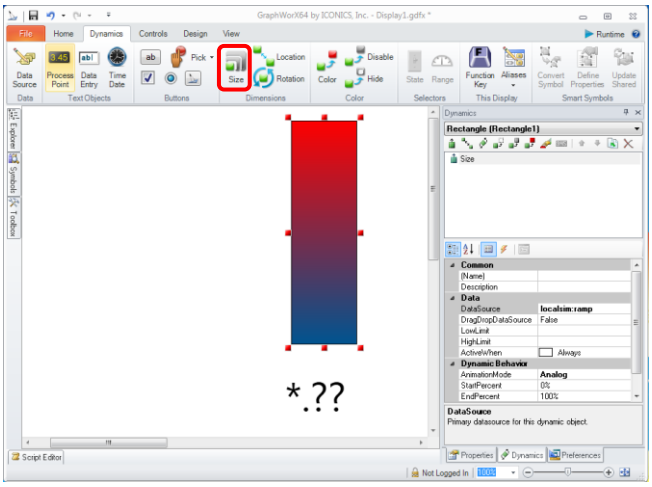

Figure 7 - Adding the Size Dynamic to the Rectangle Object

9. Click on the three dots … next to the **DataSource** property to browse for the tag as described before.
10. Consider changing the LowLimit and HighLimit Properties to a range that makes sense for your temperature. Possible measurements are expected within the range of 0 and 350 degrees.
11. Go into runtime and you should see the rectangle resize as the temperature changes.

Configuring the AlarmWorX64 Server

The AlarmWorX64 Server is used to monitor the temperature limits. You can follow the steps below to configure an alarm.

1. Start the **GENESIS64 Workbench** and select the **AlarmWorX64 Server** application. The handle (indicated in red in Figure 8) can be moved upwards to expand the list with applications presented.

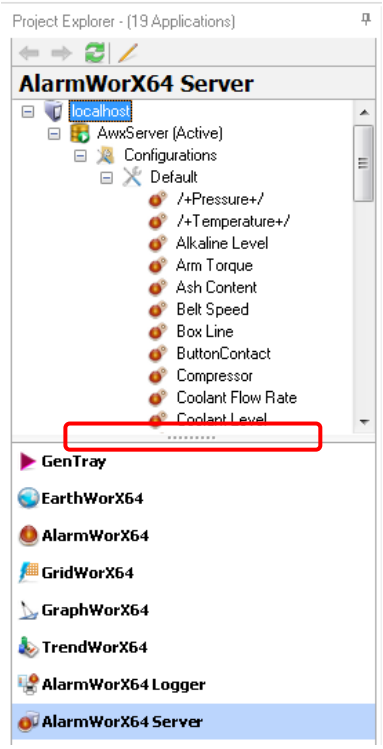

Figure 8 - Using the AlarmWorX64 Server

2. Expand the localhost tree and right-click on the **Default** alarm configuration and select add tag.

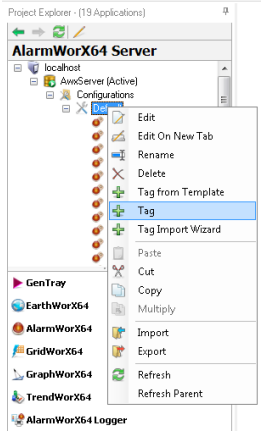

Figure 9 - Adding a Tag to the AlarmWorX64 Server

3. Give the alarm tag a **Name** of **Temperature** and browse for the Temperature tag in the **OPC Input** field.

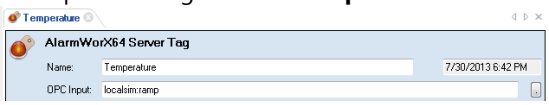

Figure 10 - Defining the Properties of a Tag in AlarmWorX64 Server

4. The **General** tab is also used to associate the alarm tag to one or more alarm areas. Click on the **Add** button for the **Areas**, click **Plant Area A**, and click on **OK**.

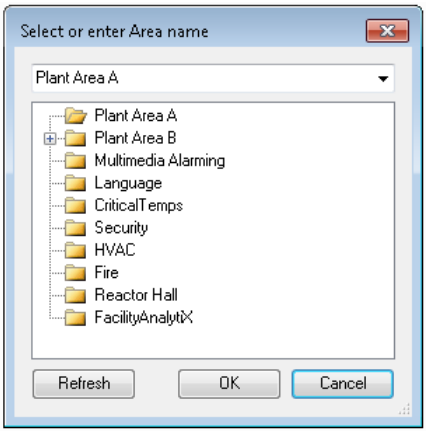

Figure 11 - Selecting the Area of the Alarm

5. Click on the **Alarms Limit/Digital** tab and configure the **Limits** as shown in Figure 12 and click Apply.

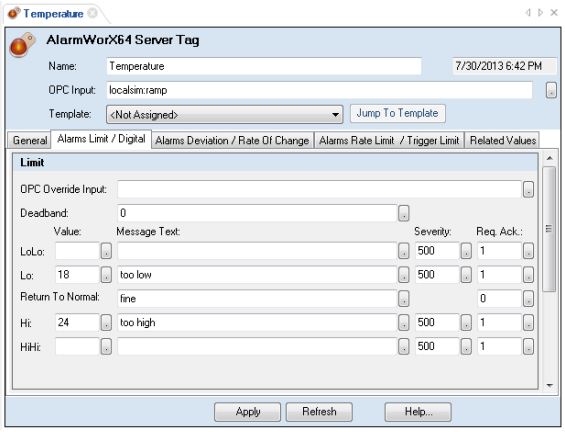

Figure 12 - Creating a Limit/Digital Alarm

6. The green light indicates that the Alarm Server is running and alarms are monitored.

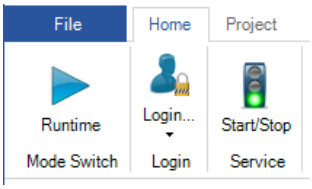

Figure 13 - AlarmWorX64 Server Started

Viewing the Alarm

1. To visualize alarms, we need to add the ICONICS **AlarmWorX64 Viewer** to the Display.
2. Click the **AlarmWorX64 Viewer** in the Controls tab.

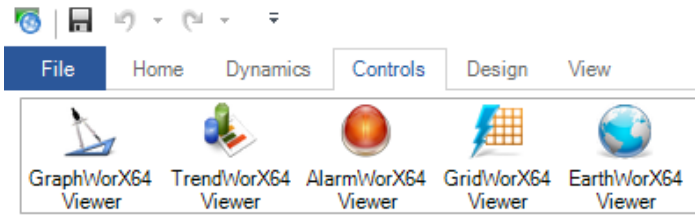

Figure 14 - Controls Tab of the GraphWorX64 Ribbon

3. In the contents area, hold the left-mouse button while you drag the mouse to draw the desired size of the alarm viewer.
4. There should already be a default subscription to the viewer. If you go into runtime, you should see your alarm when it reaches the alarming state.

Viewing a Trend

1. In configuration mode of GraphWorX64, click on the TrendWorX64 Viewer in the Controls tab of the ribbon.
2. In the contents area, hold the left-mouse button while you drag the mouse to draw the desired size of the trend viewer.
3. Double-click the **TrendWorX Viewer** and click on **Chart** to set the **Legend** to be shown in the **Bottom** of the Trend.
4. Right-click **Chart** to add a new **Plot.** Right-click the new **Plot** to add **Pen.**
5. Click **Pen** to change the **DataSource**. You can select the same tag (temperature) that we have been using.
6. You can change the Pen Description to **Temperature**.

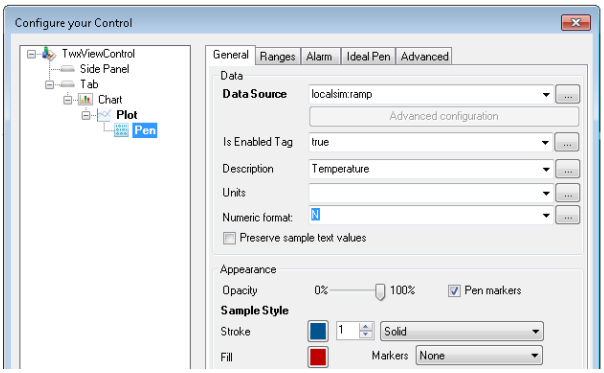

Figure 15 - Configuring the TrendWorX64 Viewer

7. Click Close to return to the GraphWorX64 display contents area.
8. Your display should look now look similar to Figure 16.

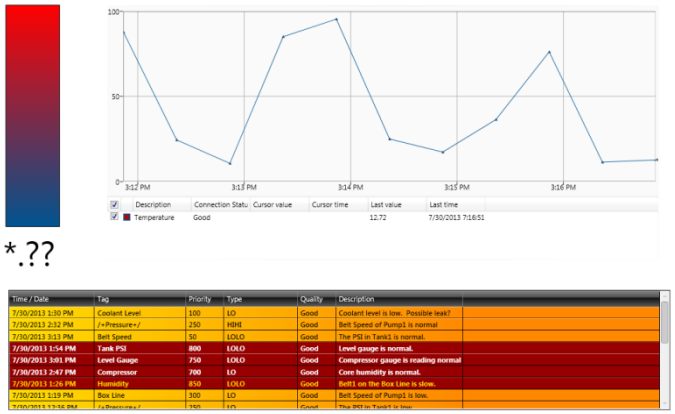

Figure 16 - Display with TrendWorX64 and AlarmWorX64 Viewers

9. Save the display. When you go into runtime you should see your temperature trend, along with alarms and a temperature status bar.