



ScriptWorX64 - Easy Integration with OPC Enabled Global Variables



APPLICATION NOTE

September 2013

Description: Guide to read trigger information in ScriptWorX64
OS Requirement: Vista x64/ Windows 7 x64/ Windows 8 x64/
Windows Server 2008 x64/ Windows Server 2008 R2 x64/
Windows Server 2012
General Requirement: Installation of GENESIS64 v10.80.

Introduction

This document will introduce you to the Global Variables that were implemented into ScriptWorX64. Before reading this document, you should be familiar with GENESIS64 and ScriptWorX64. You should also read the application note titled *ScriptWorX64 – Features in the ScriptWorX64*, which would give you a general idea of what has changed in ScriptWorX64.

OPC Enabled Global Variables

Values of ScriptWorX64 Global Variables can be used in multiple scripts or even multiple Designers/Threads and custom applications. The global variables can share their values within ScriptWorX64 and they also support OPC DA in such a way that ICONICS applications can read and write to the ScriptWorX64 Global Variables values as standard OPC Clients. ScriptWorX64 Global Variables are accessible via OPC when ScriptWorX64 is in Runtime mode or when a Designer/Thread (or a single script) executes a read or write command for a Global Variable. ScriptWorX64 Global Variables provide many advantages because they are available to both scripts and OPC clients, and you can use the OnVarChange event to execute a script when the Global Variables change.

Basic Setup

1. Open ScriptWorX64 by going to **Start → All Programs → ICONICS ScriptWorX64 → ScriptWorX64 Configurator**.
2. If this is the first time you are using ScriptWorX64, create a new configuration file and a new project.
3. Create a new designer by right-clicking on the project and select **New → Designer/Thread**. Check the “Has Timer” checkbox in the VBA Designer Properties section in the right-hand pane, and then click on “Apply”.

Figure 1 - Designer Properties: Has Timer

4. Right-click on the Designer/Thread that you have just created and select **New Script**. Give the Script a name.
5. Click on the “Browse” button to bring up the Unified Data Browser. Select the “UDM Data tab”, and from the “Time Triggers” and select “Every 10 Sec” trigger. Click on “OK” to return to ScriptWorX64 Configurator.
6. Click on the “Edit VBA Code” button to bring up the VBA editor.
7. In the “NewScript” sub, replace the “TODO: Add your code here” with the following code:

```
g.Variables.Write "MyGlobalVariable3", _  
g.Variables.Read("MyGlobalCounter"), g.Thread.Identif  
  
g.Thread.ConsoleMsg MSG_INFO_VERBOSE, _  
"MyGlobalVariables Script", "Value changed at: " &  
& Time & " on " & Date
```

8. The first line will write to the ScriptWorX64 Global Variable “MyGlobalVariable3”. The second line will enter a message into the appropriate thread console of MonitorWorX, which we will discuss later.

Initializing/Terminating Global VBA Variables

1. In the VBA editor, scroll to the top and add “Dim MyCounter As Integer” just bellow “Option Explicit”. This will create a counter that is shared for all scripts in this Thread/Designer.

NOTE: The counter “MyCounter” is a variable of integer type globally used with respect to the Thread/Designer. ScriptWorX64 Global Variables are global for all Designers/Threads and other ICONICS OPC clients in the form of OPC data.



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- In case you want to initialize your object properties (such as ScriptWorX64 Global Variables) when the Thread/Designer starts, you can do it in the “GlobalInstance_OnConnection” sub. For instance, add the following lines below the “Private Sub GlobalInstance_OnConnection” line in place of the “TODO” line:

```
g.Variables.Write "MyGlobalVariable1", 0,
g.Thread.Identif
g.Variables.Write "MyGlobalVariable2", 0,
g.Thread.Identif
g.Variables.Write "MyGlobalVariable3", 0,
g.Thread.Identif
g.Variables.Write "MyGlobalVariable4", 0,
g.Thread.Identif
g.ConsoleMsg MSG_INFORMATION, "GlobalVariables", _
    "MyGlobalVariable1 - MyGlobalVariable4 have been
    initialed"
```

- This code will write the value of 0 into the Global Variables “MyGlobalVariable1” through “MyGlobalVariable4” It will also send a message to the MonitorWorX console. Because this code is in the GlobalInstance_OnConnection sub, it will be executed when this Thread/Designer starts.
- Similarly, if you want to release or terminate some objects when a Designer/Thread is terminated, you can add your code into the “GlobalInstance_OnDisconnection” sub. We will not add any code here for this example.

OnTimer and OnVarChange Events

- Scroll to the “Public Sub OnTimer” line and add these two lines in place of the “TODO” line:

```
g.Variables.Write "MyGlobalCounter", MyCounter,
g.Thread.Identif
MyCounter = MyCounter + 1
```

- This will write the current value of “MyCounter” variable into the “MyGlobalCounter” ScriptWorX64 Global Variable then increase the value of the counter by one.
- Go to the “Public Sub OnVarChange” and add the following lines in place of the “TODO” line:

```
If name = "MyGlobalVariable1" Then
    g.Variables.Write "MyGlobalVariable2", newVal,
    g.Thread.Identif
    g.ConsoleMsg MSG_INFO_VERBOSE, "MyScript", _
        "Entered value " & newVal & " has been copied from" & _
        "MyGlobalVariable1 " & "into MyGlobalVariable2"

ElseIf name = "MyGlobalVariable3" And _
    threadIdentif <> g.Thread.Identif Then

    g.Variables.Write "MyGlobalVariable4", _
    g.Variables.Read ("MyGlobalCounter"), _
    g.Thread.Identif
    g.ConsoleMsg MSG_INFO_VERBOSE, "MyScript", "Value " _
        & newVal & _
        " from MyCounter has been written into
        MyGlobalVariable4"

End If
```

- The “OnVarChange” sub is able to catch any change of any ScriptWorX64 Global Variable. In that sub, we can check any of the following parameters to determine the name of the variable that changed and other properties about it. The parameters are:

- name:** Name of the global variable that has been changed
- oldVal:** Value of the variable before the change
- newVal:** Value of the variable after the change
- threadIdentif:** ID of the thread that wrote the new value

- In our code, we checked if the variable changed was MyGlobalVariable1 or MyGlobalVariable3, and we performed different actions depending on which variable was changed.

NOTE: Inserting a new value into a global variable will trigger the OnVarChange event, even if that change was made from the OnVarChange sub. Beware of infinite loops!

Testing the Script

- Save your script by going to File → Save. Close the VBA editor and return to ScriptWorX64 Configurator.
- Select File → Make All VBA DLLs, and then go into Runtime by selecting Action → Start Runtime (or clicking the traffic light).
- To see the script in action, open a GraphWorX64 display by going to Start → All Programs → ICONICS → GENESIS64 → GraphWorX64 → GraphWorX64.
- Insert a new process point via Dynamics and browse via Data Browser (or add syntax manually) the following point(s):

@swx:AppStatus.Value

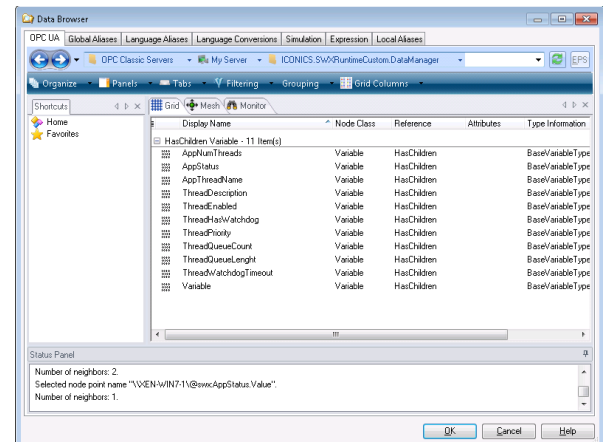


Figure 2 - Process Point Syntax



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5. If you want, you can also add another process point(s) for “MyGlobalVariable1” and “MyGlobalVariable2”. Syntax should be following:
 @swx:Variable("MyGlobalVariable1").Value
 @swx:Variable("MyGlobalVariable2").Value
6. Enter runtime, now you can change the value in the “MyGlobalVariable1” PPT/DE and watch it automatically get copied by the script into the PPT/DE for “MyGlobalVariable2”. This is being done by the OnVarChange script.
7. Go back to configuration mode and, using the same method as above, insert PPT/DE for these variables:
 - MyGlobalCounter
 - MyGlobalVariable3
 - MyGlobalVariable4
8. Put GraphWorX32 into runtime. Notice that “MyGlobalCounter” increases by one every second. This is because of our OnTimer script. Also, the “MyGlobalVariable3” PPT/DE gets the value from the “MyGlobalCounter” PPT/DE every 10 seconds due to our MyGlobalVariables script.
9. Insert a new value into the “MyGlobalVariable3” PPT/DE. Your new value is inserted into “MyGlobalVariable3” and the value from “MyGlobalCounter” is copied into “MyGlobalVariable4”. This is also happening because of the OnVarChange script.
10. You can see the messages we are writing to MonitorWorX.
11. Launch MonitorWorX by going to Start → Programs → ICONICS Tools → MonitorWorX.
12. Go to the Runtime tab of MonitorWorX and select ScriptWorX64 Runtime → Console.

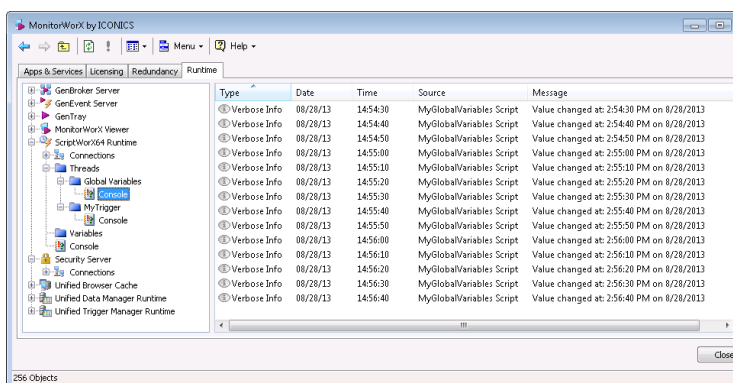


Figure 3 - MonitorWorX Console