ScriptWorX2010 – Reading Trigger Information

APPLICATIONS NOTE

October 2013

Description: Guide to reading trigger information in ScriptWorX2010
OS Requirement: Win 2000, XP Pro, Server 2003, Vista, Server 2008, Windows 7
General Requirement: Familiarity with VBA, ScriptWorX2010, and Unified Data Manager triggers

Introduction

ScriptWorX2010 has the capability to get information about the Unified Data Manager trigger that caused it to execute. You can find out which alarm triggered a script in the case of an alarm trigger, the old and the new value of the triggering OPC tag in the case of a data trigger, the related values of any trigger type, and more.

The examples in this application note prints the results to the ScriptWorX2010 console in MonitorWorX, which can be found in MonitorWorX on the Runtime tab under ScriptWorX2010 Runtime → Console.

The TriggerData Class

Every triggered script in ScriptWorX2010 has an input parameter named "td", which is an object of the TriggerData class. The td object contains information about the trigger that caused this script to execute.

You see the different members of the TriggerData class by opening up the Object Browser (F2) while editing a script in the VBA editor. Search for "TriggerData", or pick SWXRuntimeLib from the library dropdown and choose "TriggerData from the Classes list. This application note will discuss how to use a few of the most commonly used members.

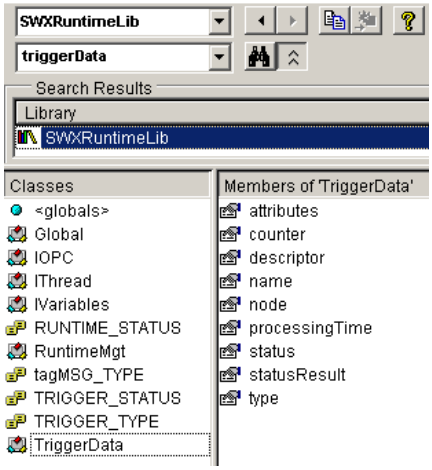

Figure 1 - TriggerData Members

Trigger Name and Type

You can tell the name or type of the trigger that triggered this script using **td.name** and **td.type**.

The different possible values of td.type are:

- 0 – TRIGGER_TYPE_TIME
- 1 – TRIGGER_TYPE_PERIOD
- 2 – TRIGGER_TYPE_DATA
- 3 – TRIGGER_TYPE_ALARM
- 4 – TRIGGER_TYPE_FILE
- 5 – TRIGGER_TYPE_NTEVENT
- 6 – TRIGGER_TYPE_DB

Example

This example will return different results based on whether the trigger was a data trigger or not.

```
Public Sub TestScript(td As TriggerData)
    On Error GoTo ErrHandler

    If td.Type = TRIGGER_TYPE_DATA Then
        g.ConsoleMsg MSG_INFORMATION, td.name, _
            "This is a data trigger"
    Else
        g.ConsoleMsg MSG_INFORMATION, td.name, _
            "This is NOT a data trigger"
    End If

    Exit Sub
ErrHandler:
    g.ConsoleMsg MSG_SEVERE_ERROR, "Script", _
        "'TestScript' failed"
End Sub
```

Source	Message
DataTrigger for SimulatePLC Sine Change	This is a data trigger

Source	Message
ExamAlarmSubscription.OnLoLoEvent	This is NOT a data trigger

Figure 2 - Result Messages for Data Trigger (top) and Alarm Trigger (bottom)

The td.descriptor and td.attributes Arrays

The td object has two members called "descriptor" and "attributes". These are both arrays of the same size and they contain information about the trigger. The size of the arrays and their values varies based on the type of trigger.

Td.descriptor is an array that contains the names of the different attributes, and **td.attributes** is an array that contains the attribute values.

NOTE: A list of the different attributes for each trigger type can be found at the end of this application note.

Example

This is a simple example of how to print out the first five of the descriptors and attributes for a given trigger.

```
Public Sub TestScript(td As TriggerData)
    On Error GoTo ErrHandler

    Dim i
    For i = 0 To 4
            g.ConsoleMsg MSG_INFORMATION, i, _
            td.descriptor(i) & ": " & td.attributes(i)
    Next i

    Exit Sub
ErrHandler:
    g.ConsoleMsg MSG_SEVERE_ERROR, "Script", _
        "'TestScript' failed"
End Sub
```

For a data trigger, the above code should produce results similar to the ones shown in Figure 3.

Source	Message
0	Time Stamp: 11/10/2009 10:34:40 PM
1	Time Stamp ms: 604
2	Value: 0.94810563325882
3	Quality: 192
4	P.Time Stamp: 12:00:00 AM

Figure 3 - Results of Example Code

Trigger Related Values

Triggers can be configured to have constants or OPC tags as related values. These are configured on the Related Values tab of that trigger in the Unified Data Manager.

The related values for a trigger are stored as arrays inside of the td.attributes array. The related values, their qualities, and their timestamps are usually (but not always) the last four items in the td.attributes array.

Example

This example will print out the value and qualities of all of the related values for a data trigger. Since we know this is a data trigger we know that the array of related values is in position 10 and the array of related qualities is in position 11.

NOTE: A list of the different attributes for each trigger type can be found at the end of this application note.

```
Public Sub TestScript(td As TriggerData)
    On Error GoTo ErrHandler

    If td.Type = TRIGGER_TYPE_DATA Then

        Dim relatedValuesArray, relatedQualitiesArray
        relatedValuesArray = td.Attributes(10)
        relatedQualitiesArray = td.Attributes(11)

        Dim i
        For i = 0 To UBound(relatedValuesArray)
                    g.ConsoleMsg MSG_INFORMATION, _
                "Related value " & i, _
                "Value: " & relatedValuesArray(i) & _
                " Quality: " & _
                relatedQualitiesArray(i)
        Next i
    End If

    Exit Sub
ErrHandler:
    g.ConsoleMsg MSG_SEVERE_ERROR, "Script", _
        "'TestScript' failed"
End Sub
```

These are the results you might get for a data trigger that has these four related values:

- ICONICS.Simulator.1\SimulatePLC.Ramp (OPC tag)
- ICONICS.Simulator.1\SimulatePLC.Ramp2 (OPC tag)
- ICONICS.Simulator.1\SimulatePLC.Sine (OPC tag)
- “This is my value” (constant value of type VT_BSTR)

Source	Message
Related value 0	Value: 66 Quality: 192
Related value 1	Value: 58 Quality: 192
Related value 2	Value: 0.886693716049194 Quality: 192
Related value 3	Value: This is my value Quality: 192

Figure 4 - Results of Example Code

NOTE: Constant related values always have a quality of 192.

List of Attributes

The following is a list of attributes for each trigger type. Attributes followed by “array” in parentheses are arrays.

Date/Time Triggers

- 0 - Time Scheduled
- 1 - Related Time Stamps (array)
- 2 - Related Time Stamps ms (array)
- 3 - Related Values (array)
- 4 - Related Qualities (array)

Data Triggers

- 0 - Time Stamp
- 1 - Time Stamp ms
- 2 - Value
- 3 - Qality

- 4 - P.Time Stamp
- 5 - P.Time Stamp ms
- 6 - P.Value
- 7 - P.Quality
- 8 - Related Time Stamps (array)
- 9 - Related Time Stamps ms (array)
- 10 - Related Values (array)
- 11 - Related Qualities (array)

Alarm Triggers

- 0 - Activation Time
- 1 - Activation Time ms
- 2 - Quality
- 3 - Message
- 4 - Source
- 5 - Category
- 6 - Type
- 7 - Severity
- 8 - Condition Name
- 9 - Subcondition Name
- 10 - Actor ID
- 11 - Optional Attributes Array (array)
- 12 - Related Time Stamps (array)
- 13 - Related Time Stamps ms (array)
- 14 - Related Values (array)
- 15 - Related Qualities (array)
- 16 - Active Time
- 17 - Active Time ms
- 18 - Change Mask
- 19 - New State
- 20 - Acknowledge Required

File Triggers

- 0 - Activation Time
- 1 - Root Folder
- 2 - File Cause
- 3 - Action Cause
- 4 - Related Time Stamps (array)
- 5 - Related Time Stamps ms (array)
- 6 - Related Values (array)
- 7 - Related Qualities (array)

NT Event Triggers

- 0 - Activation Time
- 1 - Number of Events
- 2 - Category
- 3 - Subcategory
- 4 - Related Time Stamps (array)
- 5 - Related Time Stamps ms (array)
- 6 - Related Values (array)
- 7 - Related Qualities (array)

Database Triggers

- 0 - Activation Time
- 1 - Number of Records
- 2 - DB Name
- 3 - Table Name
- 4 - Related Time Stamps (array)
- 5 - Related Time Stamps ms (array)
- 6 - Related Values (array)
- 7 - Related Qualities (array)