TIS#: 236

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Issued by: Mark Demick

Subject Matter
This document describes how to use the iTools OPC Scope and EuroMBus programs to read and write (DDEPoke) values using DDE from Excel to a communicating Eurotherm or 3rd party instrument.

Software Used

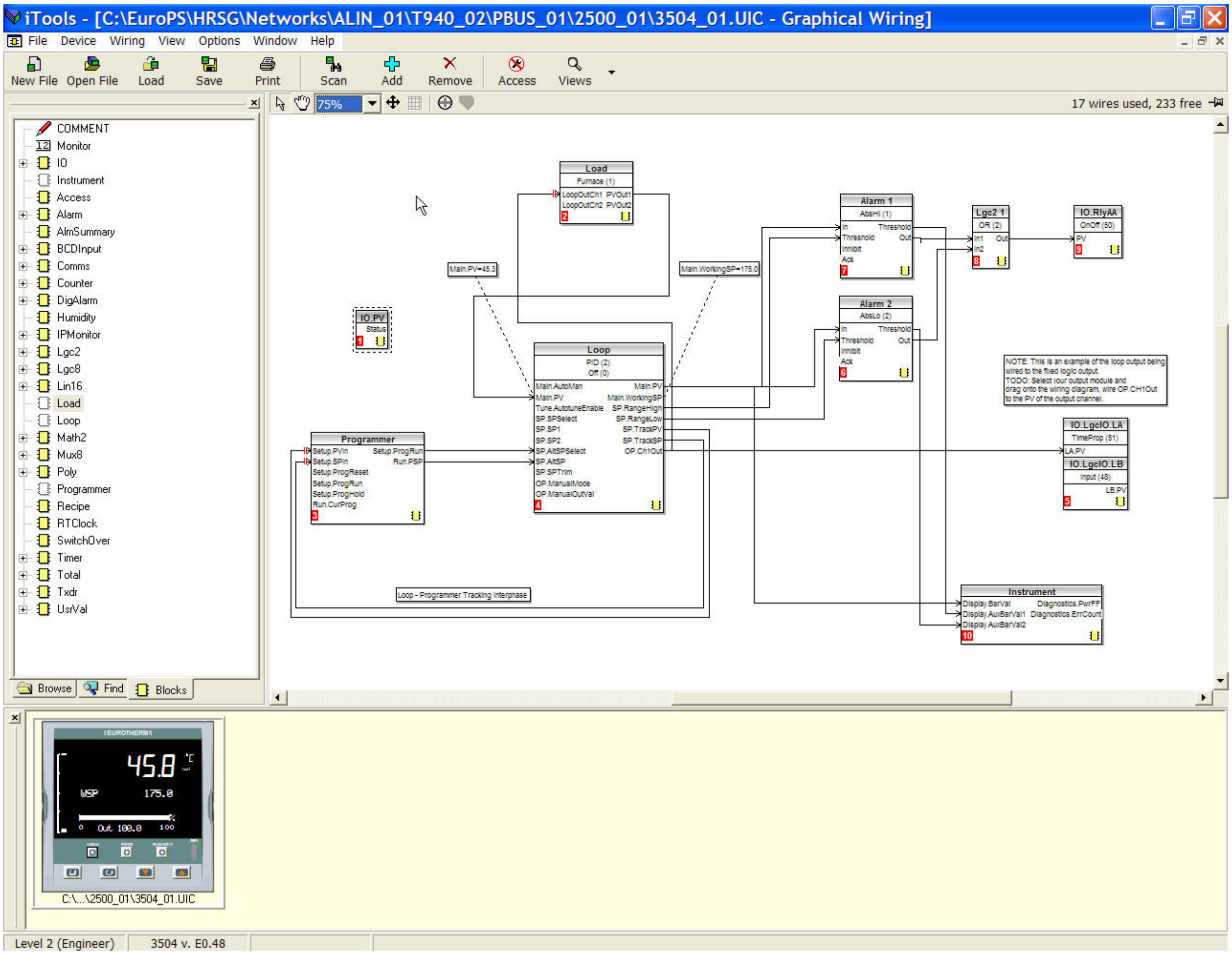
iTools V5.00; iTools components used were OPC Scope, iTools shell and EuroMBus, the iTools OPC server.

Microsoft® Excel 2002 (10.4524.4219) SP-2.

Methodology

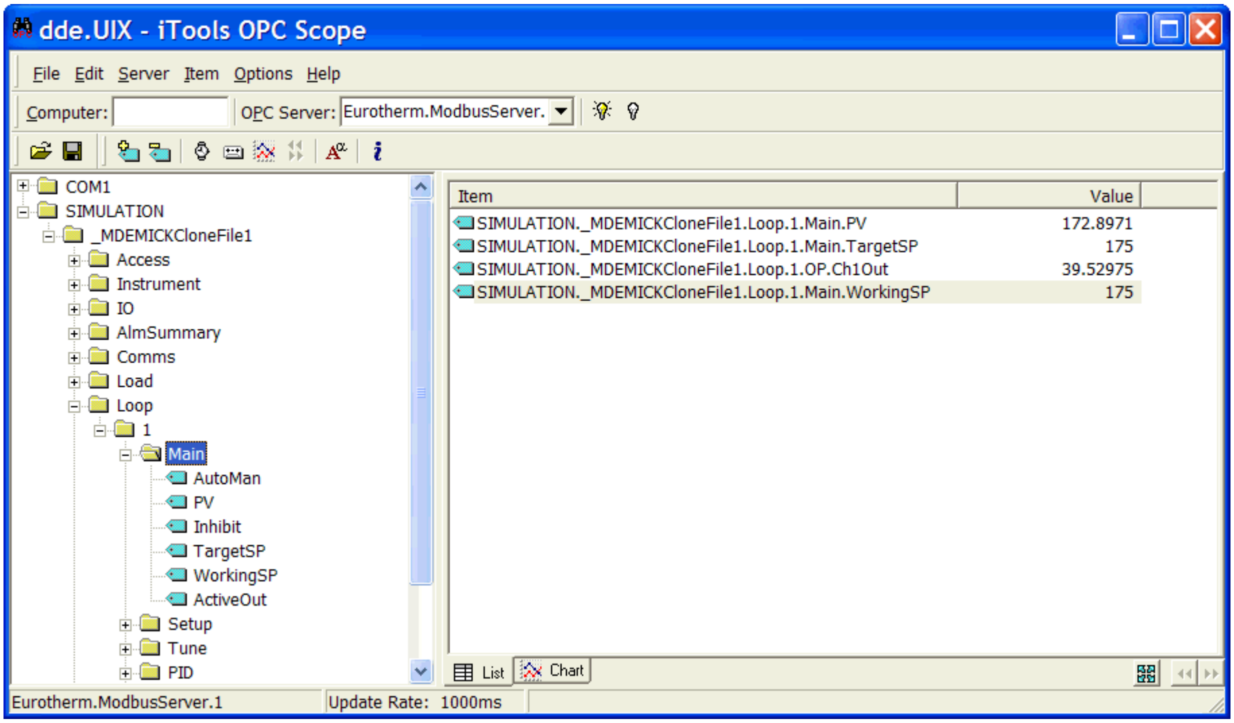
In iTools, a 3504 clone file was created that used a *Load* function block to provide closed loop simulation. Figure 1 shows the graphical wiring page used for the simulation.

Next, OPC Scope was configured with the loop parameters that were going to read and written. This was done by connecting to EuroMBus – Eurotherm.ModbusServer.1 – then from the hierarchical browse view in the left pane, dragging the desired parameters over into the right pane as shown in Figure 2. Parameters shown are; Process Value, Working and Target Setpoint, Channel 1 Output.



NOTE: This is an example of the loop output being wired to the fixed logic output.
TODO: Select your output module and drag onto the wiring diagram, wire OP.CH1Out to the PV of the output channel.

Figure 1



Computer:
OPC Server: Eurotherm.ModbusServer.

Item	Value
SIMULATION._MDEMICKCloneFile1.Loop.1.Main.PV	172.8971
SIMULATION._MDEMICKCloneFile1.Loop.1.Main.TargetSP	175
SIMULATION._MDEMICKCloneFile1.Loop.1.OP.Ch1Out	39.52975
SIMULATION._MDEMICKCloneFile1.Loop.1.Main.WorkingSP	175

Eurotherm.ModbusServer.1 Update Rate: 1000ms

Figure 2

The next step is to enter the DDE item links for the parameters that are to be read from OPC Scope into Excel. Recall the format or address of a DDE link is **Application**, **Topic** and **Item**. In Excel it is entered into the Formula Bar as:

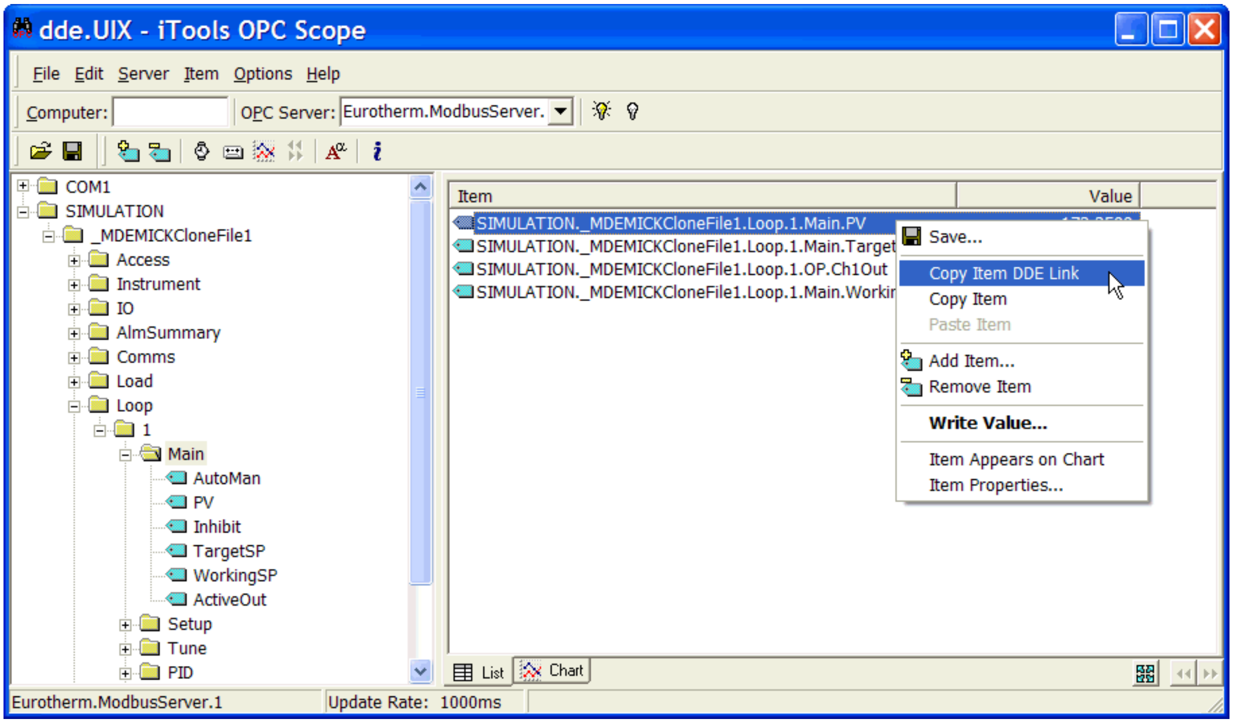
=Application|Topic!Item

Here, the Application is always **OPCscope** and the Topic **Eurotherm_ModbusServer_1**. The Item is the path to the parameter that includes the serial port or Simulation identifier, the name of the connected instrument, the parameter list name, and the parameter mnemonic, each separated by periods. This is the item name shown in Figure 2 in the right-hand pane under the Item column. All periods and dashes must be replaced by underscores (_).

For example; =OPCscope|Eurotherm_ModbusServer_1!SIMULATION__MDEMICKCloneFile1_Loop_1_Main_PV

These path names can be seen from the figure below. Otherwise Excel reports the formula contains an error.

The formula may be entered manually or by automatically into Excel. To enter the formula automatically, right click on the Item name of choice in OPC Scope. To copy the DDE link, click on 'Copy Item DDE Link' as shown in Figure 3.



Computer:
OPC Server: Eurotherm.ModbusServer.

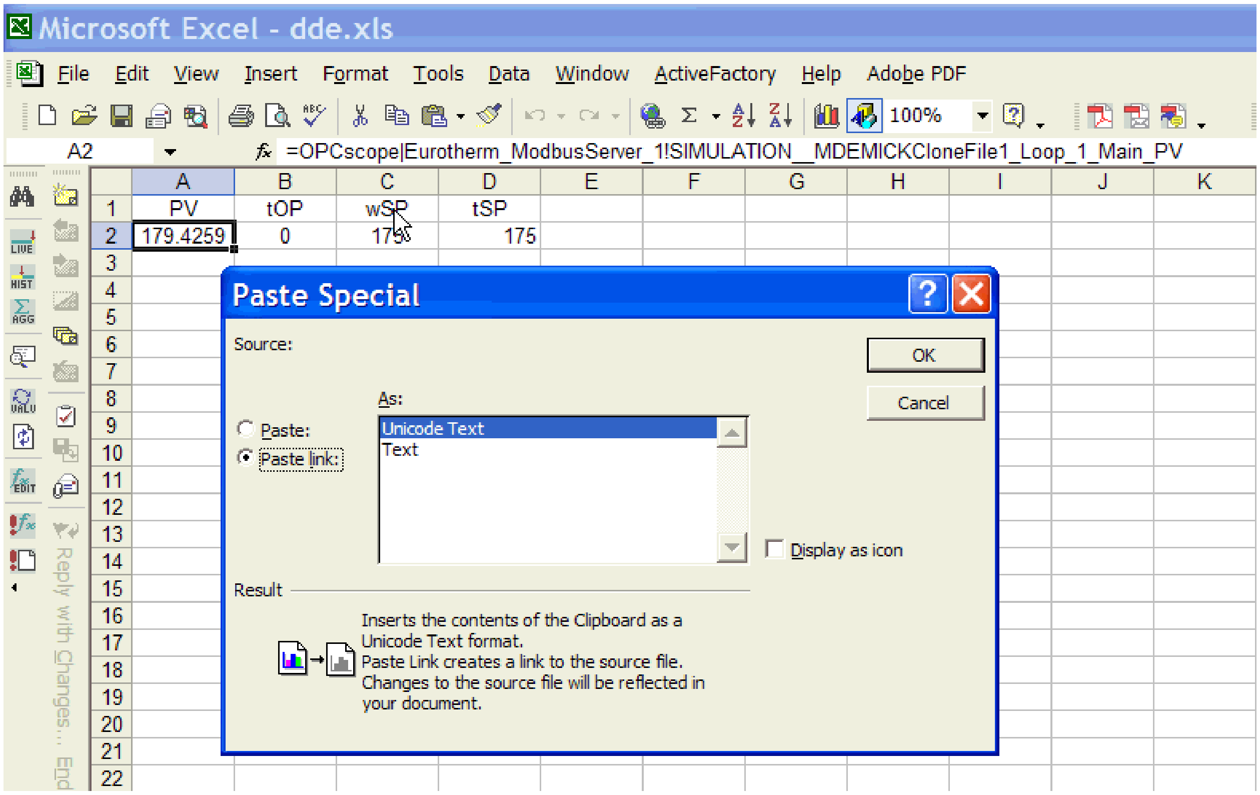
SIMULATION._MDEMICKCloneFile1.Loop.1.Main.PV
SIMULATION._MDEMICKCloneFile1.Loop.1.Main.Target
SIMULATION._MDEMICKCloneFile1.Loop.1.OP.Ch1Out
SIMULATION._MDEMICKCloneFile1.Loop.1.Main.Workir

Eurotherm.ModbusServer.1 Update Rate: 1000ms

Figure 3

The DDE Link can now be pasted into an Excel spreadsheet cell. Switching to Excel, in Figure 4 is shown a header row for the parameter labels and a row for the actual values to be read and written. Right click on the cell of choice; here A2, and a click on 'Paste Special'. The Paste Special dialog box appears. Leave the Unicode Text selected, select the 'Paste link:' check box and click the OK command button. Excel connects to OPC Scope and displays the real-time value of the parameter entered into the formula bar.

Add the loop target output and working setpoint either manually by changing the item name or automatically as described above.


Microsoft Excel - dde.xls
File Edit View Insert Format Tools Data Window ActiveFactory Help Adobe PDF
100%
LIVE
HIST
AGG
VALU
EDIT
Reply with Changes... End

A2 =OPCscope|Eurotherm_ModbusServer_1!SIMULATION__MDEMICKCloneFile1_Loop_1_Main_PV

	A	B	C	D
1	PV	tOP	wSP	tSP
2	179.4259	0	175	175

Paste Special

Source:

As:

○ Paste:
● Paste link:

Unicode Text
Text

OK
Cancel

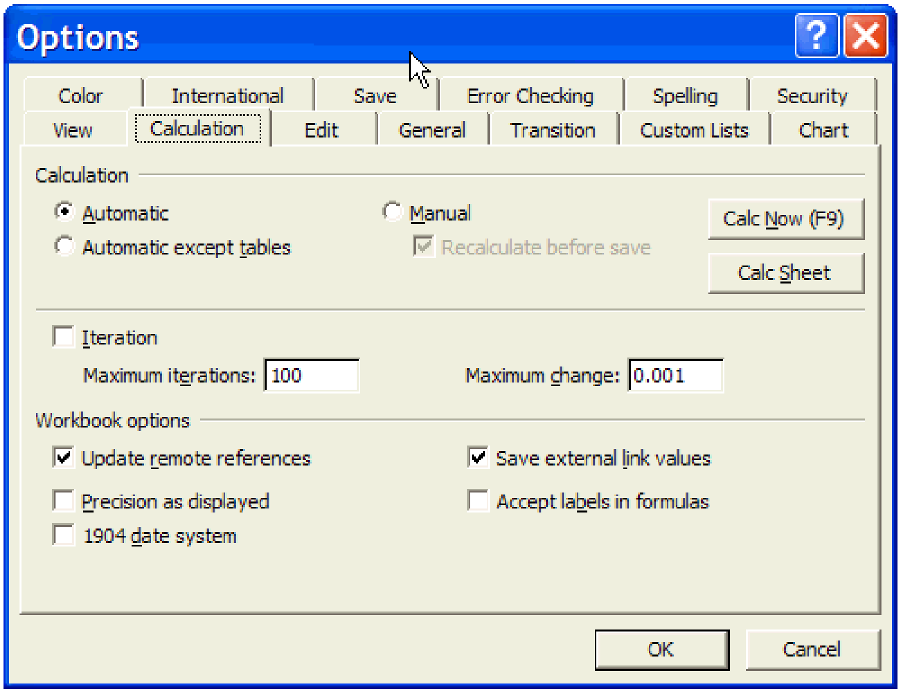
□ Display as icon

Result

Inserts the contents of the Clipboard as a Unicode Text format. Paste Link creates a link to the source file. Changes to the source file will be reflected in your document.

Figure 4

If using Excel 2002, the value may not update in real-time. In Excel, go to the Tools/Options and click on the Calculation tab. Compare it to Figure 5. Be sure Automatic is enabled in the Calculation group and Update Remote References is checked in the Workbook options group.



Calculation

● Automatic
○ Automatic except tables
○ Manual
☑ Recalculate before save

□ Iteration
Maximum iterations: 100
Maximum change: 0.001

Workbook options

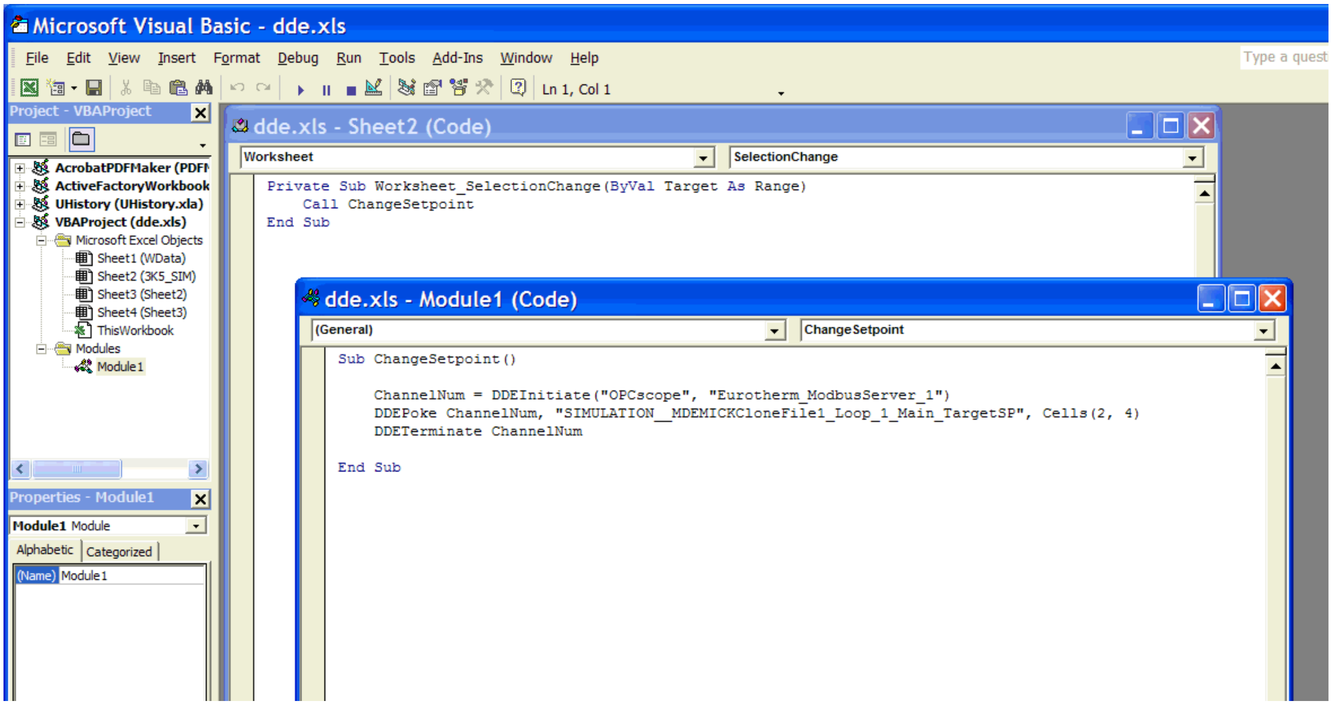
☑ Update remote references
☑ Save external link values
□ Precision as displayed
□ Accept labels in formulas
□ 1904 date system

Figure 5

To write to a parameter requires adding a Visual Basic module that uses the Application Class and the members DDEInitiate, DDEPoke and DDETerminate. The ‘ChangeSetpoint’ module code and worksheet code used to monitor worksheet changes are shown in Figure 6.

Note in Figure 4 that cell D2 is used to write the target setpoint in the simulated controller. This cell does not require a DDE address as the previously configured cells. The ‘ChangeSetpoint’ module code references Cells(2,4) or D2 in the DDEPoke line. Whenever cell D2 is changed the subroutine Worksheet_SelectionChange calls ChangeSetpoint and writes the new value to the controller.

The 3 lines shown in the ChangeSetpoint module may be repeated with appropriate changes if other parameters need to be written.



```
Private Sub Worksheet_SelectionChange(ByVal Target As Range)
    Call ChangeSetpoint
End Sub
```

```
Sub ChangeSetpoint()

    ChannelNum = DDEInitiate("OPCscope", "Eurotherm_ModbusServer_1")
    DDEPoke ChannelNum, "SIMULATION__MDEMICKCloneFile1_Loop_1_Main_TargetSP", Cells(2, 4)
    DDETerminate ChannelNum

End Sub
```

Figure 6

For clarity and copying, the code used in the Visual Basic modules are repeated below.

```
Private Sub Worksheet_SelectionChange(ByVal Target As Range)
    Call ChangeSetpoint
End Sub

Sub ChangeSetpoint()

    ChannelNum = DDEInitiate("OPCscope", "Eurotherm_ModbusServer_1")
    DDEPoke ChannelNum, "SIMULATION__MDEMICKCloneFile1_Loop_1_Main_TargetSP", Cells(2, 4)
    DDETerminate ChannelNum

End Sub
```