

8 *Extended MODBUS OPC Server*

8.1 Foreword

The Extended MODBUS OPC Server is an OPC compliant Server able to communicate with Extended MODBUS devices (MODCELL / MOD 30ML) and serve data to OPC clients. This MODBUS OPC server was implemented using advanced programming concepts of OPC specifications.



This OPC Server also supports generic MODBUS protocol and can be used to connect ABB Commander series instruments and other instruments that support MODBUS RTU protocol.

The Extended MODBUS Server is installed in the same manner as the ViZapp Software. Refer to the ViZapp installation lab for details.

8.2 Objectives

In this lab, we will install the Extended MODBUS OPC Server, configure a server database and add a device to it. We will use this database to download the PIDLAB Strategy from the previous lab to the MOD 30ML instrument.

We will also populate the OPC database with tags using the MODBUS Interface File (.MIF) created in the previous lab and monitor the data by reading them from the instrument using the built-in OPC Client of the Extended MODBUS OPC Server.

After completing this lab you should be able to:

- Configure a Extended MODBUS OPC database
- Download the Instrument document (strategy)
- View the signals using the built-in OPC Client

8.2.1 OPC Tag Database

The database is typically made up of the following:

Devices: These are hardware devices (MODCELL / MOD 30ML) connected to the OPC Server.

Groups: Tags/Signals can be placed together into groups. Groups, if used, are shown at the top level under a device. In the Extended MODBUS OPC database, the grouping will be based on the grouping in the CL block in the instrument database database.



Each block in the database will be one group and will have the selected attributes of that block. For example, if you have a block named FIC-100, the group will be called FIC-100 and the signals like PVI, SP, OP etc, will be tags belonging to that group.

Blocks inside a compound will be grouped into a bigger group with name as the compound name.

Grouping is only for the user's convenience. If aliases are configured in the CL block for tags, then the tags will be attached to the devices directly (at the root level).

Tags: Tags define the properties of signals such as address of the signal, group and device it belongs to, data type and scaling. Examples of tags are PVI, SP, OP etc, of a PID block.



Having a .MIF file is very handy. Connecting the MIF file to a device in the OPC tag database will create the groups and signals automatically. This will save a tremendous amount of time compared to creating them manually.

In the case of generic MODBUS devices such as ABB Commander series instruments, you have to create the groups and tags manually and should define their properties.

8.2.2 Built-in OPC Client

An OPC Client application is built-in with the Extended MODBUS OPC Server for monitoring and testing your Server's configuration. It is this part of the OPC application that collects data received by the OPC Server and presents to the user. The data presented by the OPC Client is live.

OPC Client is useful for testing the communication between the devices and the OPC Server. It can also be used for testing other 3rd party OPC applications connected to the server.

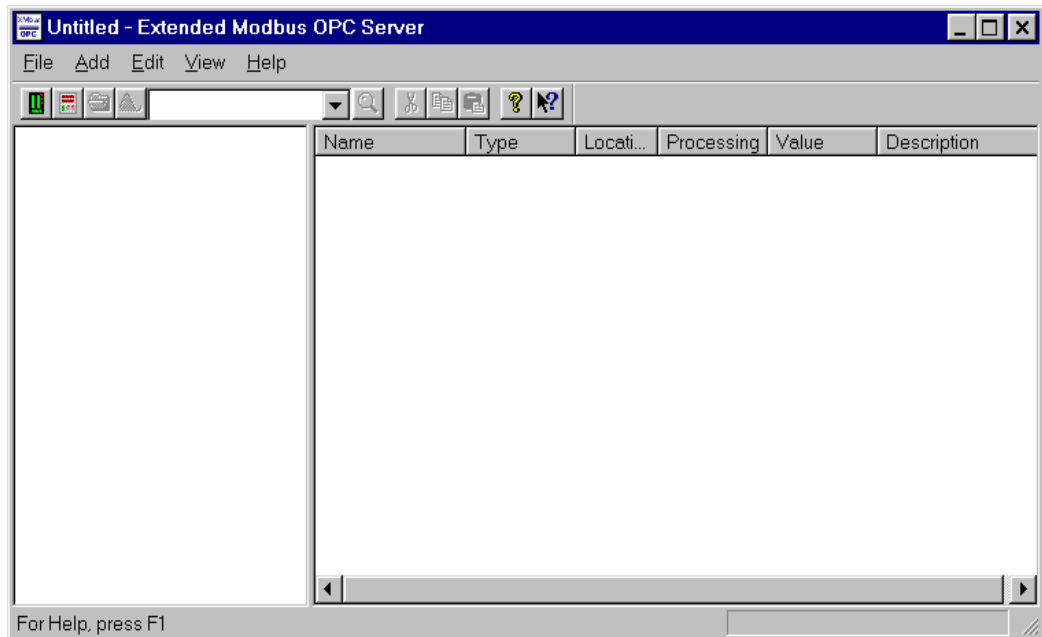
8.3 Instructions

8.3.1 Part 1

1. Install the Extended MODBUS OPC Server. Refer to the ViZapp setup lab for help.
2. **Launch the Extended MODBUS OPC Server:** From the Windows **Start** menu, select **Programs-MicroMod Automation-XMBOPC**.
 - The OPC Server will launch as shown in figure 4.1.
 - A blank tag database **Untitled** is opened by default.

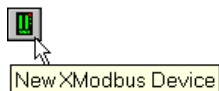
We will add a device to this database. We will save this database later.

Figure 8 .1.
MICROMOD
Extended MODBUS
OPC Server



3. **Add a hardware device to the database:** Click on the **New XMODBUS Device** button on the toolbar or select **Add-New XMODBUS Device** from the menu bar at the top. This will open the **Extended MODBUS Device Properties** dialog box as shown in the figure below:
 - We will configure the properties of the MOD 30ML device we are adding in this dialog box.

Figure 8 .2.
Add new Extended
MODBUS Device



Extended MODBUS OPC Server

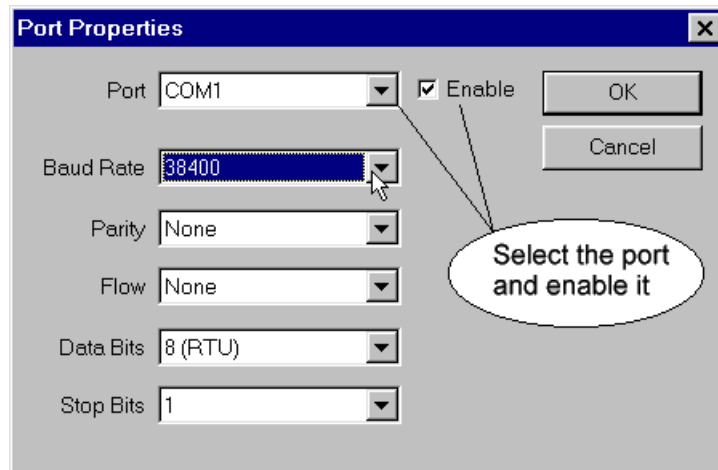
- Type the name MOD30ML in the Name field (the name is user-configurable and can be anything!).
- Select the serial communication port of the computer to which the MOD 30ML is connected, in the Port field. Click on the down arrow in this field to show the drop-down menu and then select the port. (COM1 for example).
- Type the instrument’s MODBUS address in the address field.
- Leave the Timeout in the default value of 500 ms.



Timeout value in ms is the time for which the OPC server tries to re-establish communication with the device in the case of a communication failure.

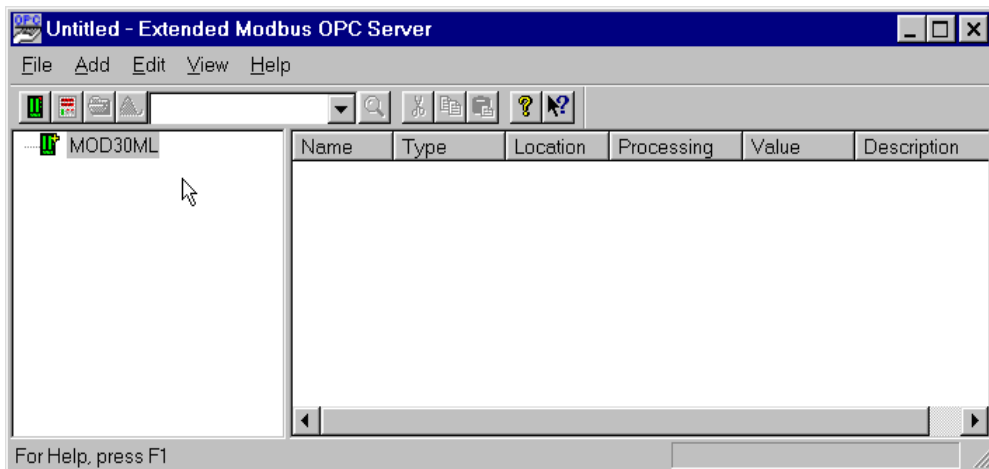
4. **Configure the serial port for the communication:** Click on the **Edit – Ports** button on this dialog box. The Port Properties dialog box will be displayed as shown below:

Figure 8 .3.
Port Properties



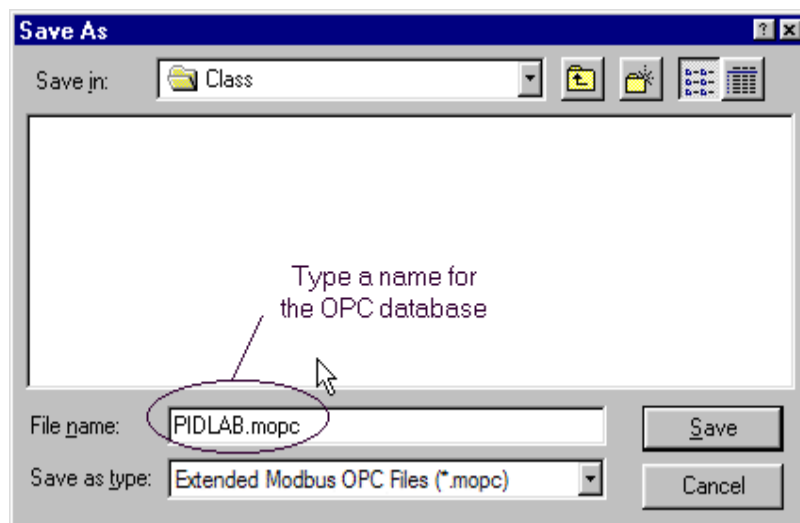
- Select the COMM port from the drop-down menu in the **Port** field and then enable it by checking the box next to the **Enable** field.
- Choose the **Baud Rate**, **Parity**, **Flow Control**, **Data bits** and **Stop bits** from this dialog box. Make sure these entries match the settings of the instrument.
- Click on **OK** to complete the Port configuration.
- The **Extended MODBUS Device Properties** dialog box will redisplay with the port number. Leave other fields on this dialog box at their default values.
- Click on OK. The added device will be displayed in the Device Tree on the left frame as shown in the next figure:

Figure 8 .4.
MICROMOD
Extended MODBUS
OPC Server
database



5. **Save the database:** The OPC tag database can be save as a file with an extension **.MOPC**.
 - Select **File – Save** from the menu bar. Refer to the following figure.
 - The **Save As** dialog box will be displayed next as shown below:
 - Choose the same folder where you have saved the PIDLAB database for saving this file and then type a name for the OPC tag database file in the **File name** field.

Figure 8 .5.
File – Save As

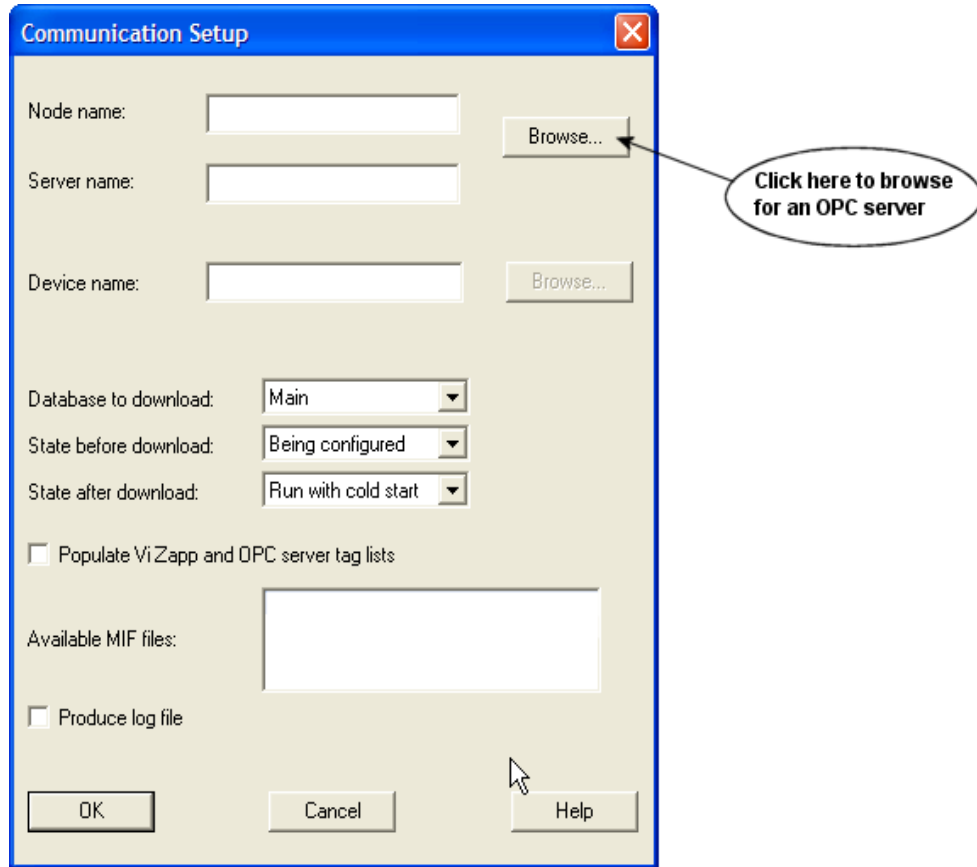
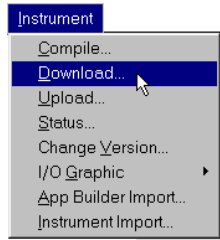


- Click on the **Save** button to save the file. The Title bar of the OPC Server will redisplay with the saved file name.
- You can now either close the Extended MODBUS OPC Server application by selecting **File – Exit** from the menu bar at the top or minimize it.

8.3.2 Part 2

6. Switch back to the ViZapp Designer. Your instrument document should be on the right frame. Select **Instrument – Download** from the menu bar at the top.
 - The Communication Setup dialog box will be displayed as shown below:

Figure 8 .6.
Communication Setup

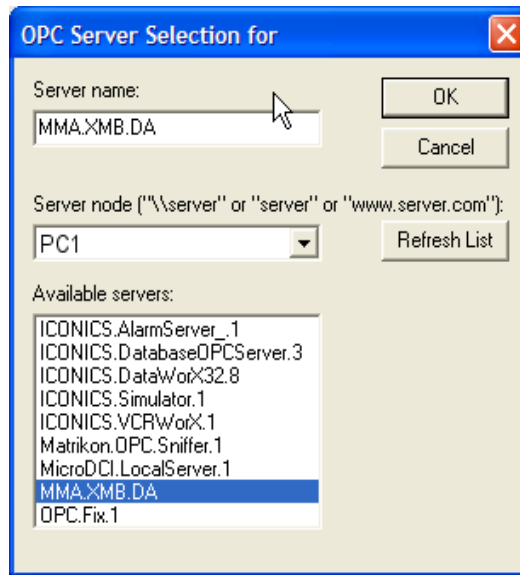


- Click on the **Browse** button next to the **Server name** field to browse the OPC Servers registered in the system.
- The **Select OPC Server** dialog box will be displayed as shown in the next figure:
- Look at the **Available Servers** box at the bottom. The **MICROMOD XMODBUS** Server should be listed there.



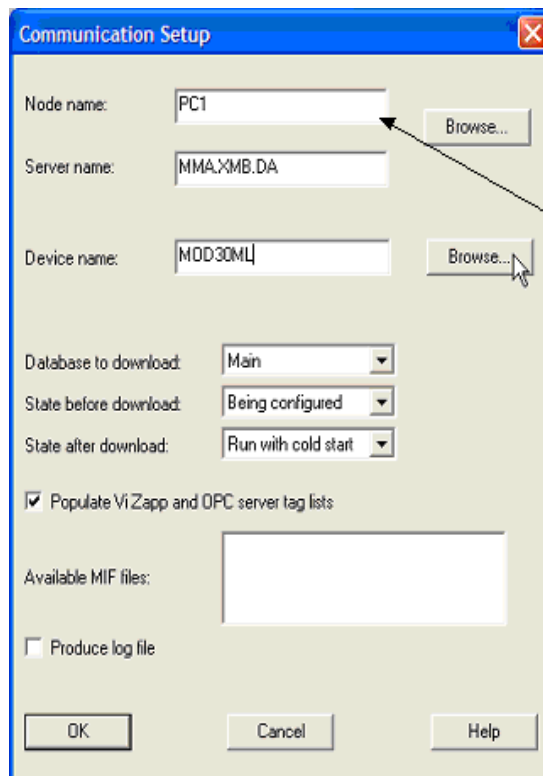
You have installed the XMODBUS OPC Server which registered it into the Windows system. If you have other OPC Servers registered in the system, you will see them in the **Available Servers** list as well.

Figure 8.7.
Select OPC Server



- Click on MMA.XMB.DA item to select it. It should now be displayed in the **Server Name** field. Click on OK.
- The **Communication Setup** dialog box will redisplay with MMA.XMB.DA in the Server Name field as shown below:

Figure 8.8.
Communication Setup



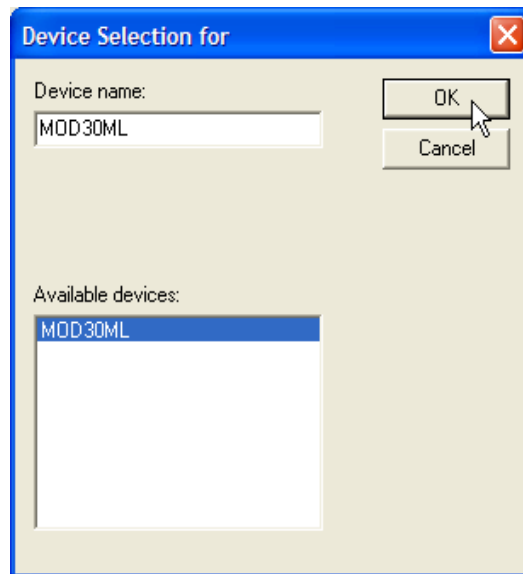
This field should default to the name of your computer. PC1 is shown for example only!

7. Select the Device: Click on the **Browse** button next to the **Device Name** field.

Extended MODBUS OPC Server

- The **Select Device** dialog box will display as shown below next. You will also notice the XMODBUS OPC Server application started automatically with the OPC database file you last saved.

Figure 8 .9.
Select Device



- This **Select Device** dialog box will show the name of the device you added to the OPC Database in Part A of this lab. Select the device and then click on OK.



The devices in the **Select Device** list are populated from the last saved/opened XMODBUS OPC Server database file

- The Communication dialog box will redisplay as shown below with the name of the device in the Device Name field.

8. Populate OPC Server tag database with attributes selected in the MODBUS Interface File (.MIF file):

- Refer to the following display.
- Check the box **Populate ViZapp and Server Tag lists** by clicking on it and then select the MODBUS Interface File **PIDLAB** from the Available MIF Files list at the bottom.

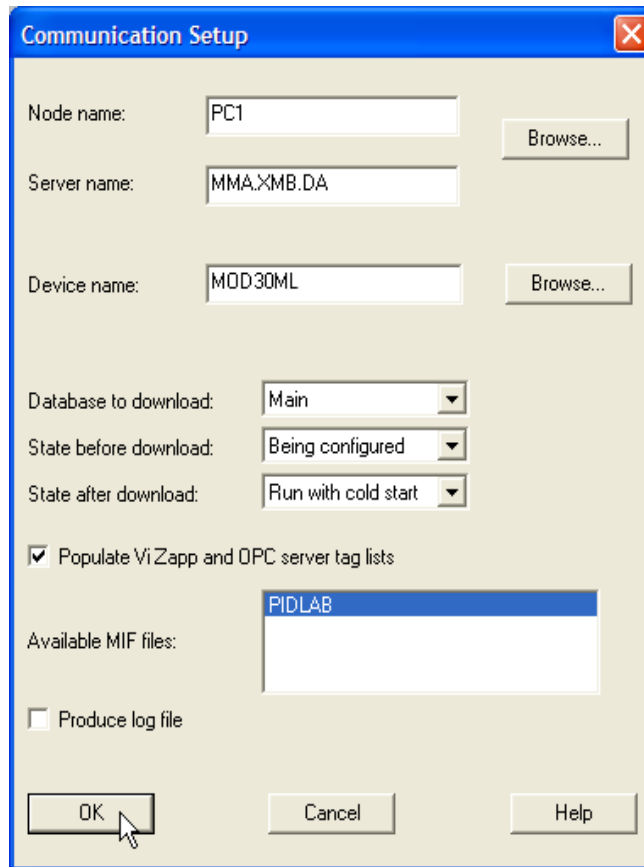


By doing this you can populate the OPC Server tag database with tags that will be automatically created from the attributes defined in the MIF file (attributes added to your Configured List blocks in the strategy). This will save a tremendous amount of engineering time as you do not have to create each tag manually.



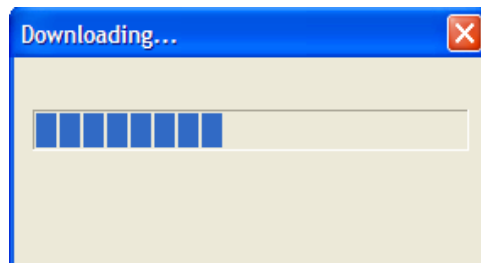
This will also create a list of Tags in the ViZapp Configurator automatically. These tags can be used to add graphic objects to your instrument documents and display documents.

Figure 8 .10.
Communication
Setup



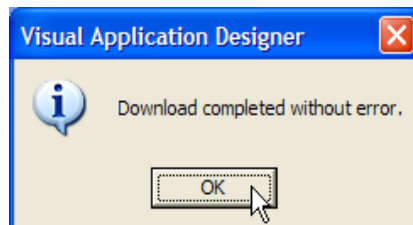
- Click on OK on this dialog box. The Download Status Indicator will display as shown below if the communication with the instrument was established. If there was no communication, you will get error message boxes.

Figure 8 .11.
Downloading



- After successful download, the following message box saying “Download completed without error” will be displayed. Click on OK.

Figure 8 .12.
Download

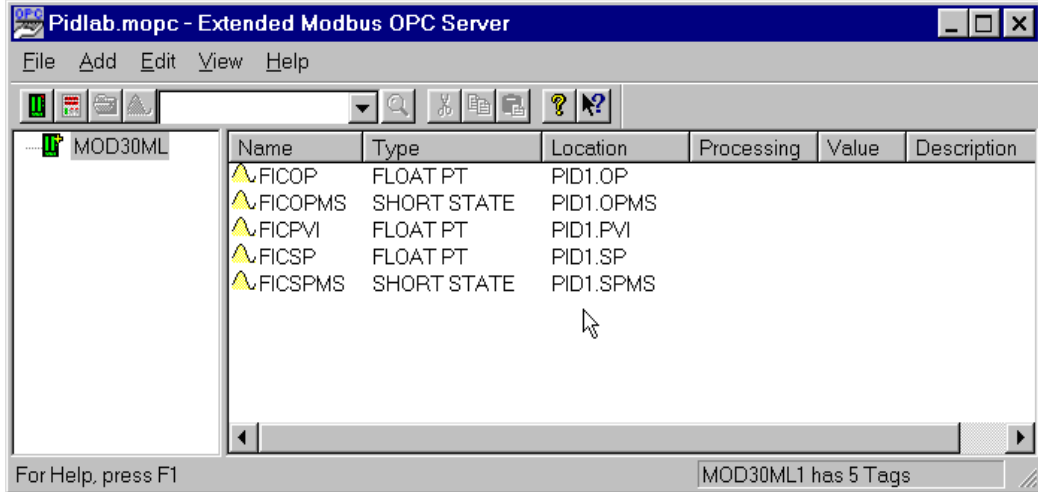


- The OPC Server application will also be closed automatically if it was started by ViZapp for downloading.

8.3.3 Part 3 – XMODBUS Server OPC Client

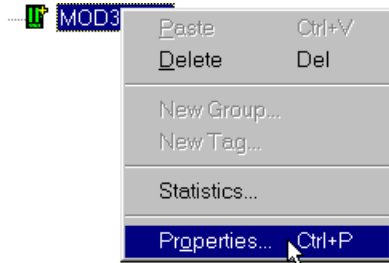
9. Launch the XMODBUS OPC Server Application if it was not running already. It will be launched with your last saved database PidLab.MOPC as shown below:

Figure 8 .13.
OPC Server
database with tags



- Do you notice that the OPC database is populated with tags from the MIF file automatically? Also notice that the tags are shown with alias names.
- Select the device (MOD30ML1) and right-click on it. Select **Properties** from the resulting menu.

Figure 8 .14.
Device Properties

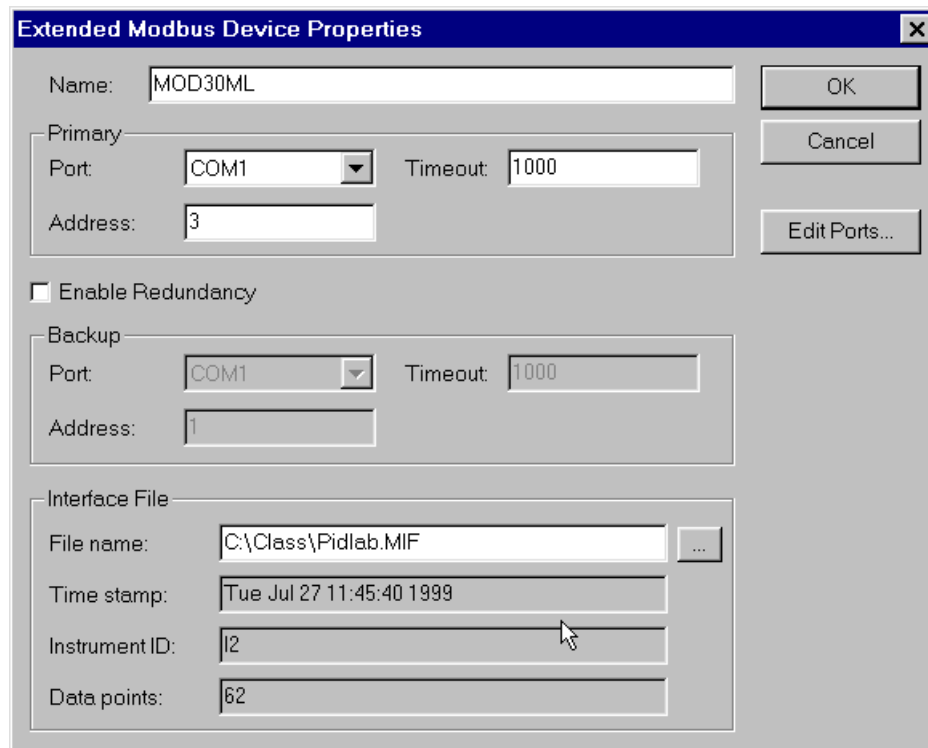


- This will display the **Device Properties** dialog as shown below:
- This dialog gives details about the MIF file in addition to the device details. Important information about the MIF file are:
 - MIF file name and location.
 - Time-stamp
 - Number of elements / tags.



By clicking on the button next to the MIF File field, you can choose a different MIF file to attach to this device. Do not do that for this lab as the MIF file is already used to populate the tags.

Figure 8 .15.
Device Properties



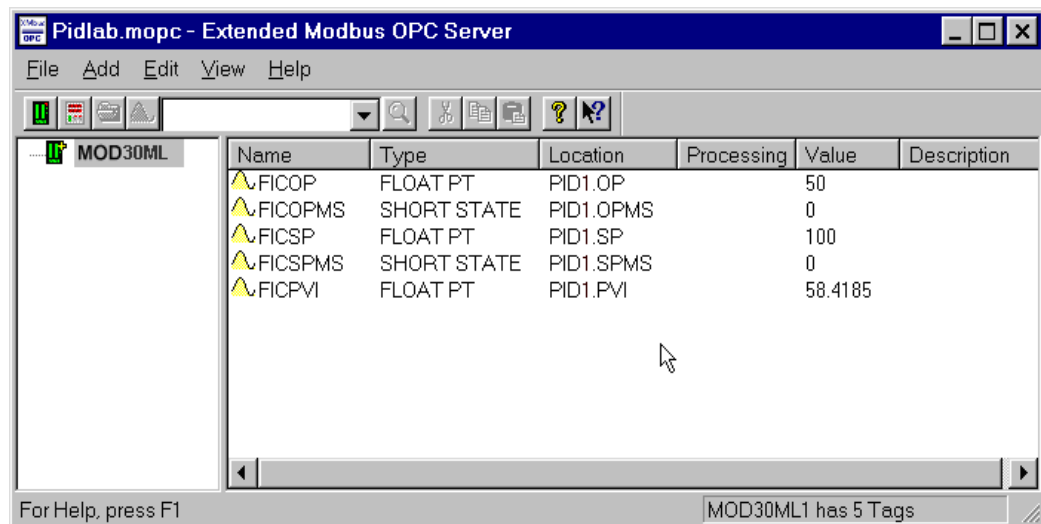
The dialog box is titled "Extended Modbus Device Properties". It contains the following fields and controls:

- Name:** MOD30ML
- Primary Port:** COM1 (dropdown), **Timeout:** 1000
- Address:** 3
- Enable Redundancy**
- Backup Port:** COM1 (dropdown), **Timeout:** 1000
- Address:** 1
- Interface File:**
 - File name:** C:\Class\Pidlab.MIF
 - Time stamp:** Tue Jul 27 11:45:40 1999
 - Instrument ID:** I2
 - Data points:** 62

Buttons on the right: OK, Cancel, Edit Ports...

- Click on Cancel on this dialog.

Figure 8 .16.
OPC Live Data

The application window displays the following table of live data for device MOD30ML:

Name	Type	Location	Processing	Value	Description
▲ FICOP	FLOAT PT	PID1.OP		50	
▲ FICOPMS	SHORT STATE	PID1.OPMS		0	
▲ FICSP	FLOAT PT	PID1.SP		100	
▲ FICSPMS	SHORT STATE	PID1.SPMS		0	
▲ FICPVI	FLOAT PT	PID1.PVI		58.4185	

At the bottom of the window, it says "For Help, press F1" and "MOD30ML1 has 5 Tags".

- View Live data by starting the built-in OPC client application:
 - Select **View - Monitor** from the menu bar at the top. This will start the built-in OPC client and show live data from the instrument in the **Value** column of the OPC Server application. Refer to the figure above.
 - To change a value for a tag that is writable in the device, right-click on the tag name and select Write Value. Writing to a read-only tag will produce an error.

Extended MODBUS OPC Server

11. View more details of the tags: Double-click on FICPVI. This will display further properties of that tag as shown below:

Figure 8 .17.
Tag properties

The screenshot shows a dialog box titled "FICPVI" with a close button in the top right corner. The dialog contains the following fields and controls:

- LSP: PID1.PVI
- High Range: 200
- Low Range: 0
- Read/Write: RW
- Data Type: FLOAT PT
- Foreground section:
 - Enable
 - Offset: 18
 - Bit Position: 0
- Foreground Quality section:
 - Enable
 - Offset: 0
 - Bit Position: 0
- Simulation signal: Random (dropdown menu)
- Buttons: OK and Close

- The above dialog displays the LSP, High and Low ranges, Read/Write of the tag.
- Click on the Close button to close this dialog.