

# **13      *Supervisory Message Lab***

## **13.1 Foreword**

The Supervisory Message block is a function block that sends or receives messages based upon being triggered via a “send” source input transition from 0 to 1, or the send command being issued via operator write.

It is used to send a single message over the ICN to another controller or internally (within the MOD 30ML or MODCELL) to an addressable attribute. Some attributes, such as controller mode, can only be written to via a supervisory message.

## **13.2 Objectives**

This lab is a continuation of the Sequence lab and builds on the database constructed to control the batch. In that lab, the sequence logic sends new setpoint values and control modes to a Temperature Controller which was not actually present in the database.

In this lab we will load the temperature control loop from the Component Gallery, set up supervisory messages to switch the control mode between Manual and Auto, and connect the setpoint value outputs from the Sequence block to the temperature controller’s remote setpoint.

When the sequence is in IDLE and CHARGE modes the temperature controller is in Manual. When the sequence reaches the HEAT step, the sequence block sends a Supervisory Message to the controller to place it in Auto, and sends the remote setpoint value 90 to the temperature controller’s Remote Setpoint Input. The controller remains in Auto with a setpoint of 90 through the COOK step. When the sequence enters the COOL step it sends a new setpoint value of 20 to the temperature controller, and when the COOL step is finished it places the controller back in Manual mode.

### 13.3 Instructions

Make sure the Sequence database you constructed in the Sequence Lab is loaded in ViZapp. You should be at the top level with the DIF, IF, ST, and SE blocks visible along with the BATCH compound.

#### A – ADD A TEMPERATURE CONTROLLER

**Step Procedure**

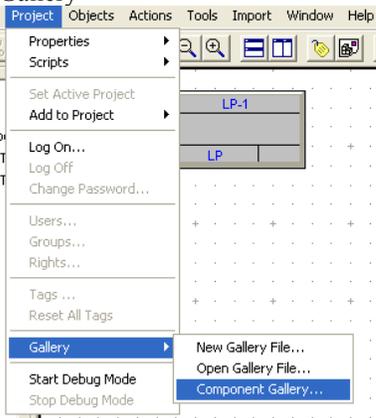
1. Place a new Loop Compound block in the workspace and name it TEMP CONTROL.
2. Right-click on the new compound block and select Open Compound.
3. On the top toolbar, click on Project / Gallery / Component Gallery

**Comments**

It is important to select Component Gallery rather than Open Component Gallery or New Component Gallery, both of which will try to install a new gallery file.

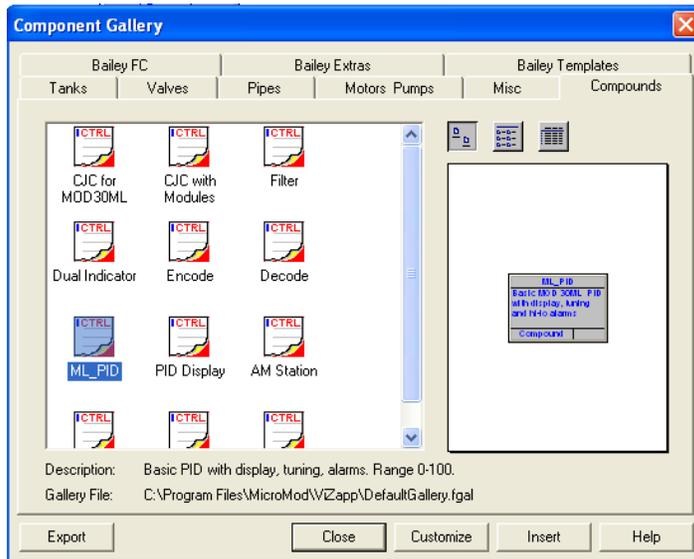
If your Component Gallery appears empty, close ViZapp. Run **Restore Gallery** from the MicroMod Automation\ViZapp folder in the Windows Start menu, then follow the directions.

Re-open ViZapp, load your strategy and open the Loop Compound, then access the Component Gallery as shown at right.

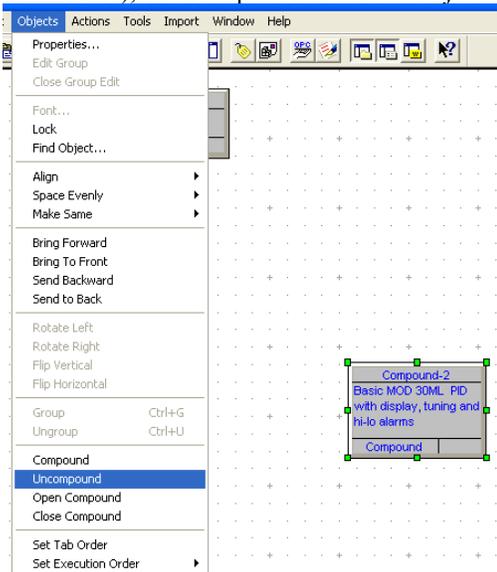


4. Click on the Compounds tab in the Gallery dialog box, select the compound ML\_PID and click the Export button.

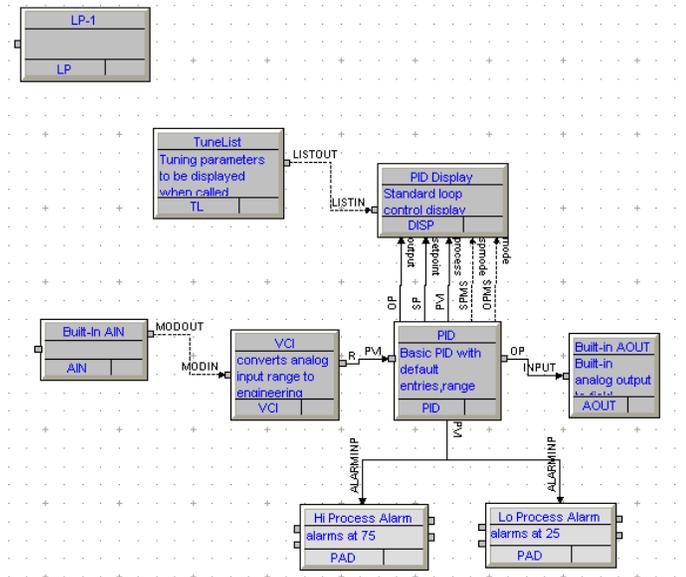
You can also double-click on the compound to be exported to your database instead of using the Export button.



- With the new compound selected (it will have green “handles” at the corners), on the top toolbar select **Objects / Uncompound**



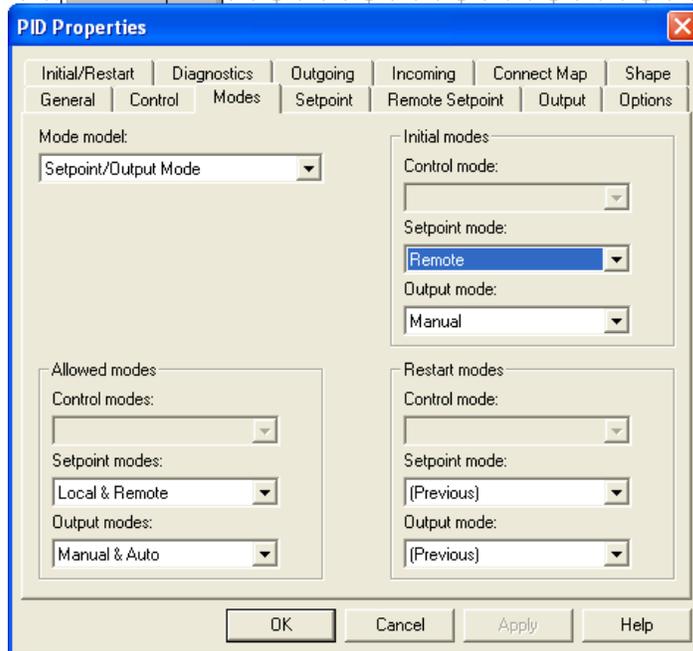
Your database workspace should now look like the figure below.



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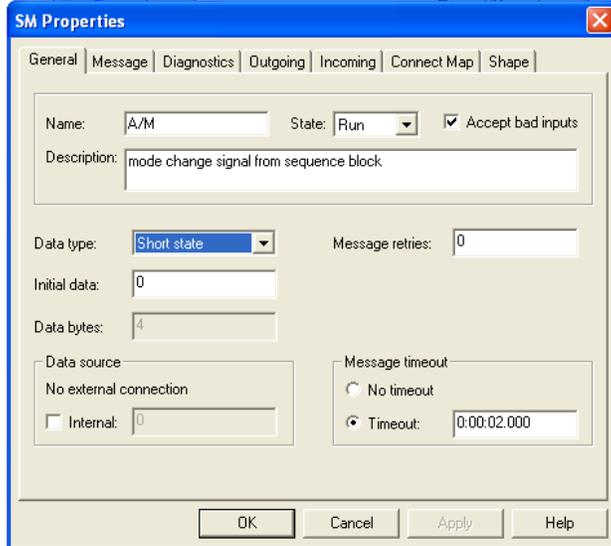
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6. Double-click on the PID block to open it.
7. Click on the Modes tab and change the Initial Setpoint Mode to Remote, then click OK to close the block.



**B – ADD THE SUPERVISORY MESSAGE BLOCK**

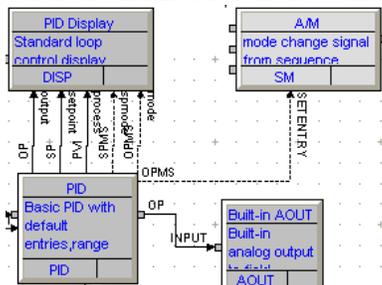
1. Select SM (Supervisory Message) from the Algorithm window and place it near the PID block.
2. Open the SM block and give it the following tag name and description:  
 Name: A/M  
 Description: mode change signal from sequence block
3. Change the Data Type to **Short State** using the pull-down menu



This block will change the controller mode based on the sequence step. Controller mode is a short-state variable.

4. Click on the Message tab. Notice that the default Message Type is ‘Set’.
5. Click OK to close the block.
6. Select the Multi-Segment connector from the Algorithm window, and click on the PID block.
7. Select the attribute **OPMS** from the connection window
8. Drag the cursor to the SM block and select it
9. Click on **SETENTRY** in the connection window.

There are several message types that can be sent by the Supervisory Message block. To change a control mode we need to use the SET command.



The connection between the SM block and the block receiving the SET command actually goes *from* the destination block *to* the SM block, and appears to be “backward”.

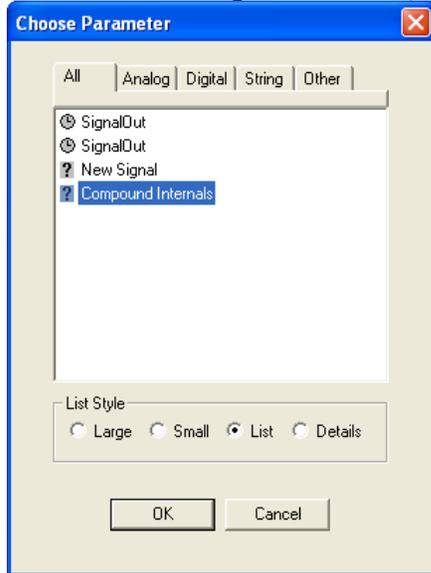
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- Right-click in the open space of your database and close the compound.

You should be at the top level of your database, with the IF, DIF, ST and SE blocks visible on the screen as well as the BATCH and TEMP CONTROL compounds.

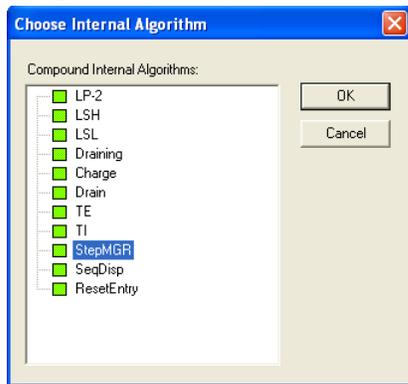
- Click on the multi-segment connector, then the Batch compound.

The Choose Parameter window appears

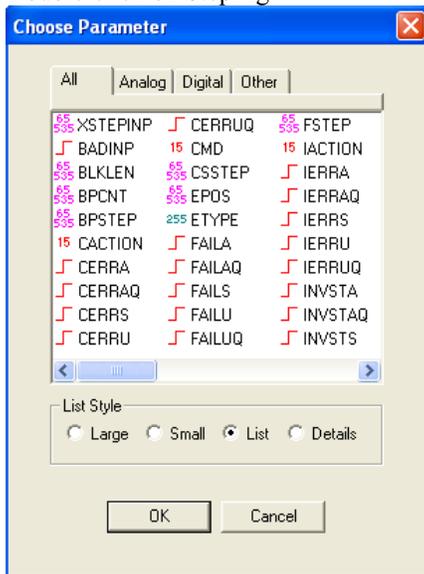


- Select Compound Internals and click OK (or double-click on Compound Internals)

A list of all the blocks inside the BATCH compound appears

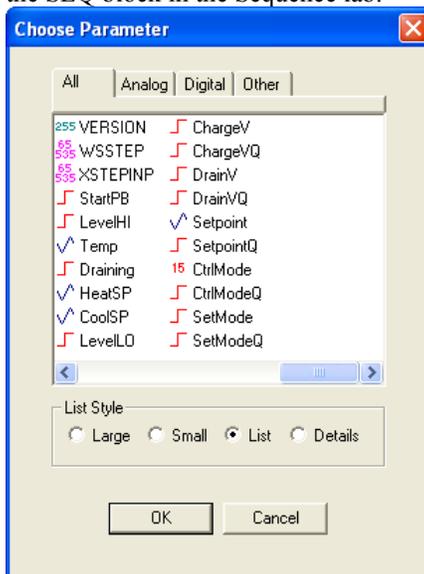


- Double-click on StepMgr



A list of all the possible connection parameters in the Sequence block appears

- Move the scroll bar at the bottom of the window all the way to the right. You should see the Inputs and Outputs you added to the SEQ block in the Sequence lab.



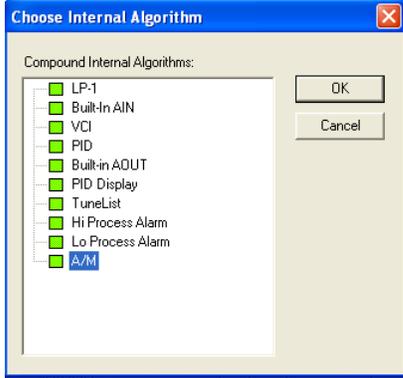
- Select CtrlMode and click OK

This sends either a “0” or “1” to the controller mode to switch between Manual and Auto, when the message is triggered.

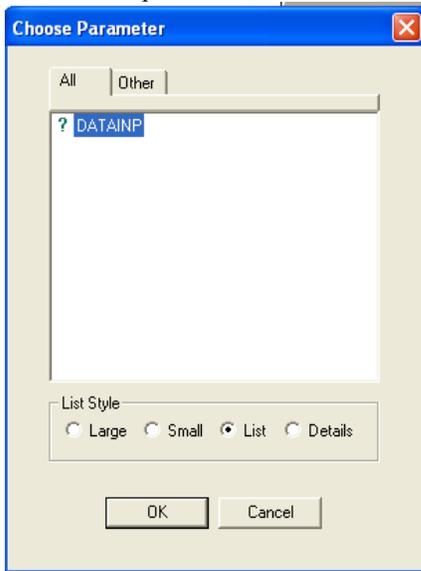
- Drag the cursor to the TEMP CONTROL compound and select it

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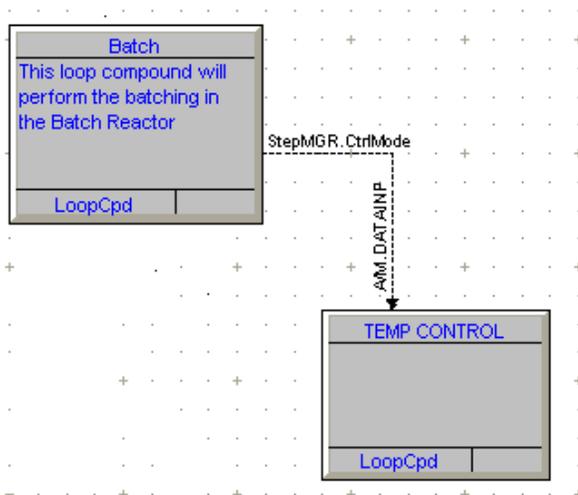
- 17. Select Compound Internals, then A/M



- 18. The only possible connection is DATAINP, therefore double-click on this parameter.



- 19. You should now have a connection between the two compounds as shown:



20. Using the same method, make the following connections:

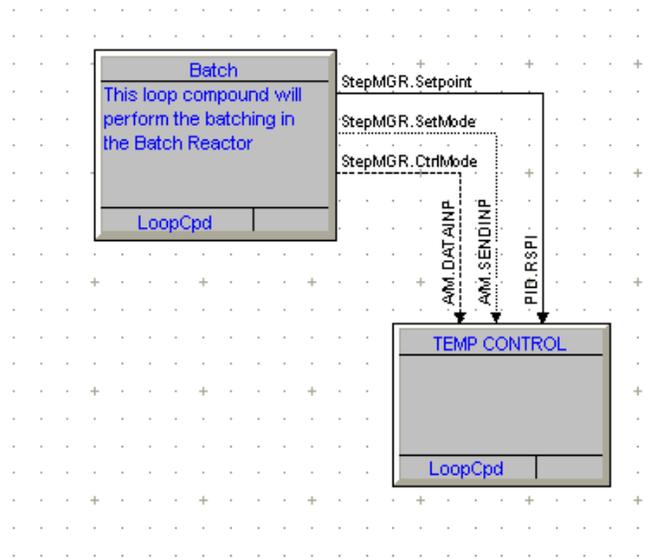
From: BATCH.StepMgr.SetMode  
To: TEMP CONTROL. A/M.SENDINP

This triggers the Supervisory Message block to send the data. It is triggered on a rising edge. This is why the output from the Sequence Block is only true for the HEAT and DRAIN steps, and false in all other steps.

From: BATCH.StepMgr.Setpoint  
To: TEMP CONTROL.PID.RSPI

This sends the new setpoint value to the PID controller.

21. Your blocks should now look like this:



### **C – ADD THE TEMPERATURE DISPLAY TO THE DIF BLOCK**

In order to see the effect of the supervisory message on the temperature controller, we will need a display on the MOD 30ML.

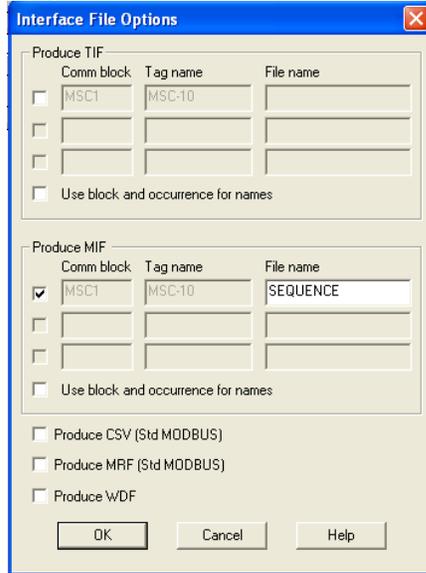
1. Double-click on the DIF block
2. Add the display name PID-100 to the Display Tag List
3. Select User display under 'Display to use at power-up' and type PID-100
4. Close the block.

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### D – DOWNLOAD TO THE CONTROLLER

1. Select an MSC block from the Algorithms window and place it in the database No configuration of this block is necessary for this lab
2. Save your database
3. Compile the database and fix any reported errors. When your database compiles properly, in the Interface File dialog window check the first box under “Produce MIF” and type the name SEQUENCE, then click OK.

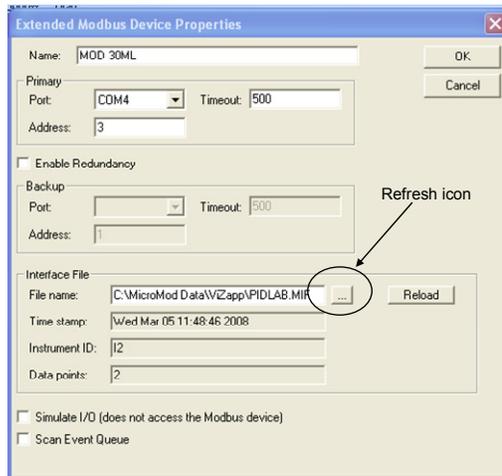


4. Open the OPC server by clicking on the OPC Server icon on the top toolbar



5. Make sure the correct Server Name, Server Node and Server are selected See the Extended Modbus OPC Server lab for assistance
6. If you already have a Device configured, double-click to open the Configuration menu. Make sure the Primary Port settings are correct. If you do not already have a device configured see Chapter 4, Extended Modbus OPC Server, for assistance

- In the Interface File Filename field, click on the Refresh icon A list of available MIF files appears



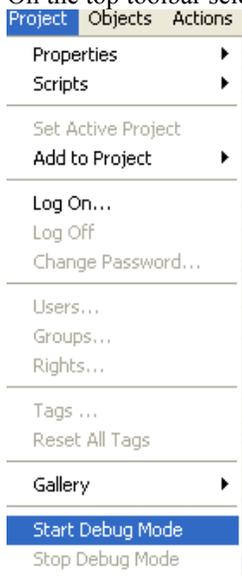
- Click on the SEQUENCE.MIF file and click Open
- Click OK to close the Extended Modbus Device Properties window
- Return to ViZapp and download the database to the controller

The PID-100 display should be on the controller front panel, with the control loop in manual and a setpoint of 0.

## **E – TEST THE CONFIGURATION**

We do not have a display for the Sequence, but we can use the ViZapp debug function to test the Supervisory Message configuration.

- Open the BATCH compound
- On the top toolbar select Project / Start Debug Mode



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3. Double-click on the StepMGR block
4. Change the Mode from Auto to Manual, and then change the Current Step from Idle to Heat. Did the PID controller come out of manual? Is the setpoint 90?
5. Now change the Current Step from Heat to Cool. Did the setpoint change to 20?
6. Finally, change the Current Step to Drain. Did the PID controller change to manual mode? Is the setpoint zero?
7. Remember to stop Debug mode when you are done with the lab.