Technical Note

Migrating from an existing MVI56-HART to PLX51-HART-4I

Document Code: TN-PLX51HART4I_Migrating from MVI56_69-HART to PLX51-HART-4I-2002

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Applicable products include:

Converting from:

- **MVI56-HART**

Converting to:

- **PLX51-HART-4I**

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Note that this document can also be used as a reference guide for migrating from MVI69-HART to PLX51-HART-4I.

Migrating from an existing MVI56-HART to the new PLX51-HART-4I, you will require to have an EtherNet/IP bridging module such as 1756-ENBT/EN2T/EN2TR on the controller chassis. The gateway will require a vacant IP address in the same subnet as the EtherNet/IP bridging module. The migration can be simple but depends on the existing configuration, it can be not straight forward. These modules use different configuration software for the configuration, but both remain easy to use.

It is highly recommended to review the PLX51-HART-4I training video on ProSoft Technology's YouTube channel.

- MVI56-HART uses **ProSoft Configuration Builder** (aka PCB)
- PLX51-HART-4I uses **ProSoft PLX50 Configuration Utility**

You can download the tools free of charge on our website:
- ProSoft Configuration Builder
- ProSoft PLX50 Configuration Utility

The PLX51-HART-4I is built with 4 HART channels, for each channel it do support multi-drop connection up to 2 devices when connecting in series (the series connection method has the advantage of the (4-20 mA) current still being controlled by one of the devices, which may be required in some applications) and up to 7 when connecting in parallel. MVI56-HART was built with 4 HART channels but it supports up to 15 devices per channel in multi-drop connection. Additional PLX51-HART-4I units and rewiring works will be required if the limit exceeds.

PLX51-HART-4I module capable to convert HART signal into either EtherNet/IP, Modbus TCP/IP, or DNP3 TCP/UDP protocols. Only one conversion can be selected per module. In this migration technical note, we will be covering on EtherNet/IP Logix conversion only.

Besides, additional features/functions are available on PLX51-HART-4I:
- FTD-DTM compatible for Asset Management Systems
  (require PLX51-HART DTM Pack Configuration Software)
- Ethernet configuration and diagnostic
  - HART device discovery, configuration, status, statistics, trends…
  - HART analog input calibration

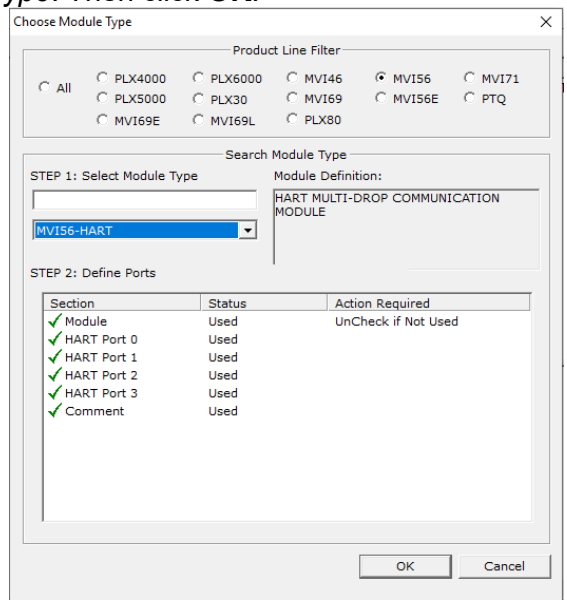
Audience:
You would be interested in this Technical Note if you are currently using Rockwell ControlLogix in-chassis HART module MVI56-HART or CompactLogix in-chasis HART module MVI69-HART to collect analog values or HART digital data from HART sensors.

Migrating MVI56-HART to PLX51-HART-4I

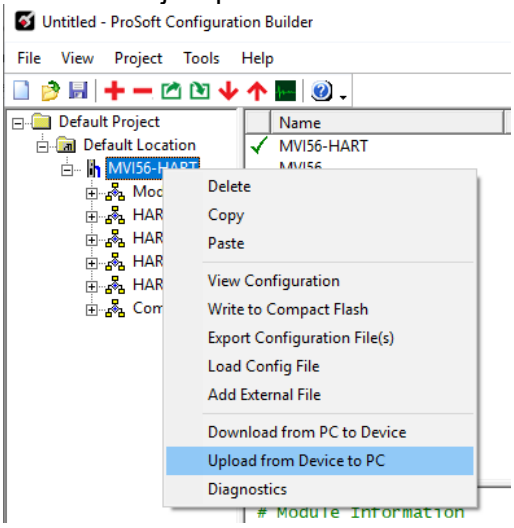
Before going into the configuration step, you will like to look into the wiring, module setup, IP address setup of PLX51-HART-4I from the User Manual. Set the module to a vacant IP address on your EtherNet/IP network.

Then, study the configuration of your MVI56-HART by opening the backup PCB file. If you do not have a backup file, you may upload your existing configuration from your module using PCB.

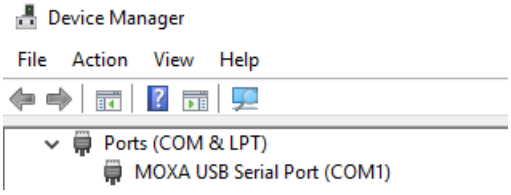
1. Launch **PCB** and create a new project. Select **MVI56** under *Product Line Filter* and **MVI56-HART** under *Module Type*. Then click **OK**.



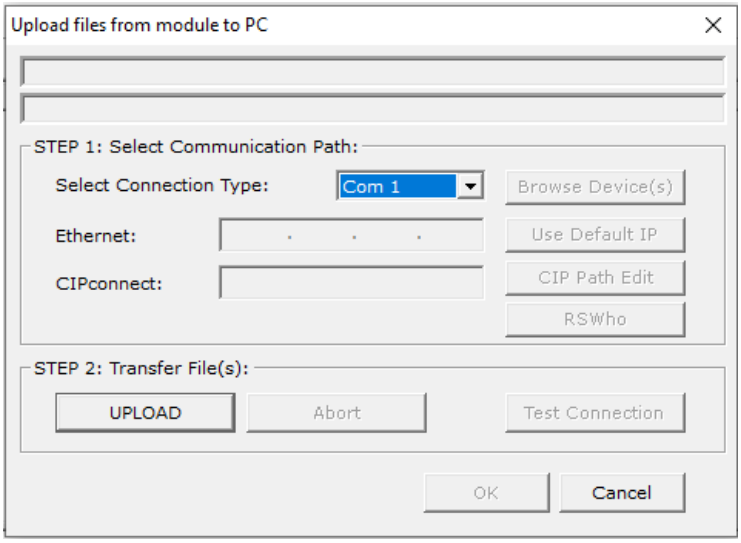
2. Right click on **MVI56-HART** from Project pane on the left. Click **Upload from Device to PC**.



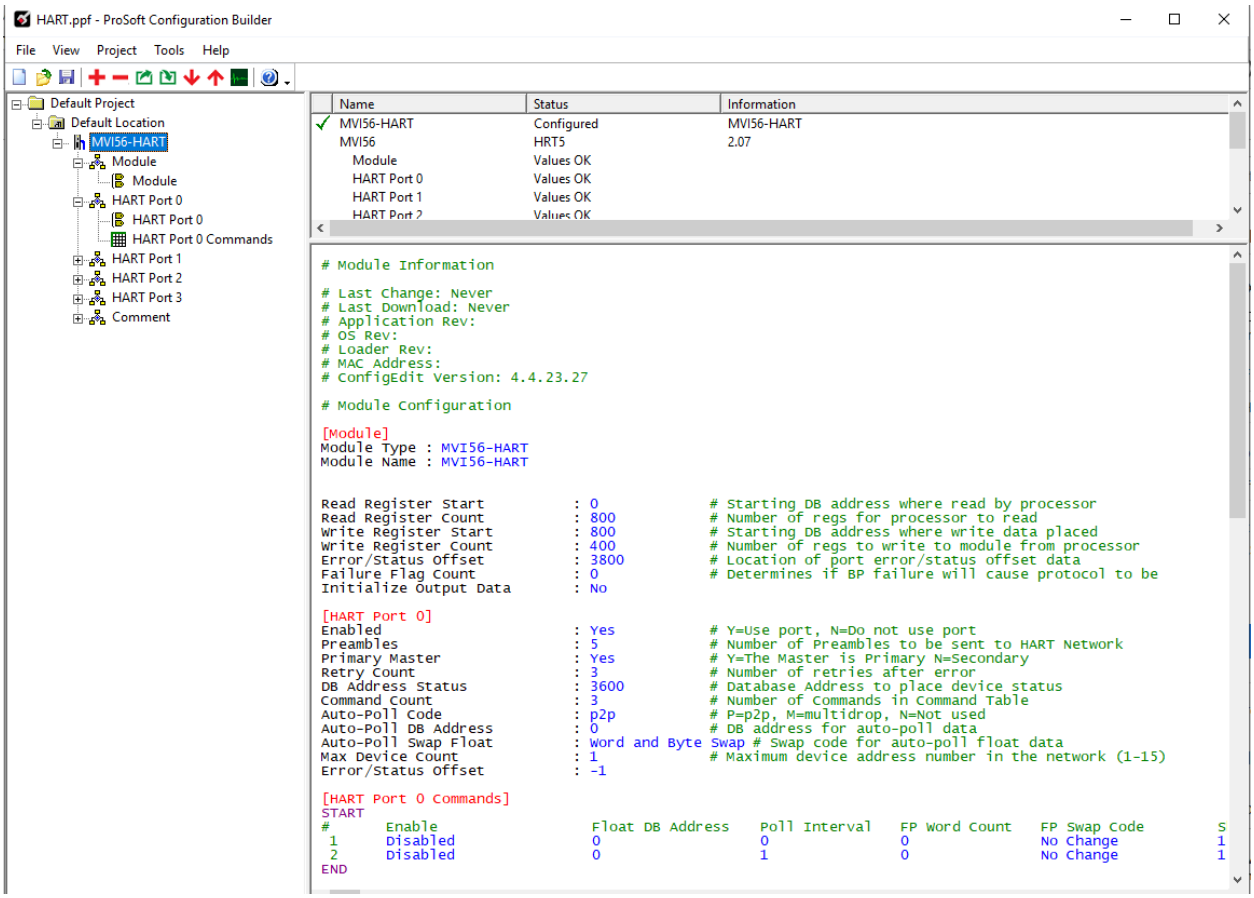
3. You will need to connect your PC to the Configuration (CFG) port using the RJ45-DB-9 Serial Adapter Cable and the Null Modem Cable (included in the package with the MVI56-HART module). If you do not have a serial port on your PC, you will need a USB-to-RS-232 Adapter. Check the running COM port number from *Device Manager*.

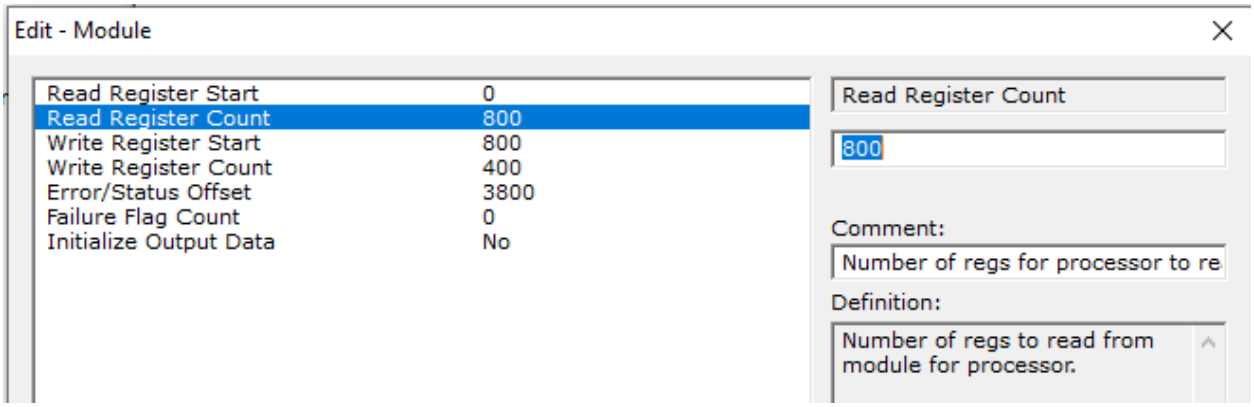


Select the COM port number in PCB Upload window and click **UPLOAD**.

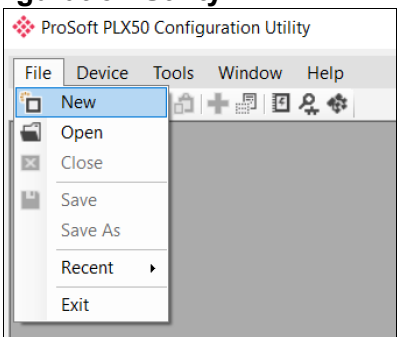


4. After upload complete, you may look into the existing configuration such as **Module Setting**, **Port Setting** and **Port Commands** by clicking the MVI56-HART icon or by section with setting description from respective icon.

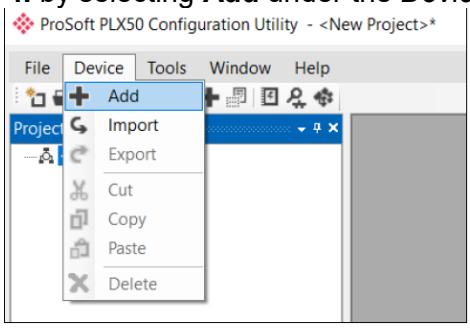

HART.ppf - ProSoft Configuration Builder
File View Project Tools Help
Default Project
Default Location
MVI56-HART
Module
Module
HART Port 0
HART Port 0
HART Port 0 Commands
HART Port 1
HART Port 2
HART Port 3
Comment
Name Status Information
MVI56-HART Configured MVI56-HART
MVI56 HRT5 2.07
Module Values OK
HART Port 0 Values OK
HART Port 1 Values OK
HART Port 2 Values OK
Module Information
Last Change: Never
Last Download: Never
Application Rev:
OS Rev:
Loader Rev:
MAC Address:
ConfigEdit Version: 4.4.23.27
Module Configuration
[Module]
Module Type : MVI56-HART
Module Name : MVI56-HART
Read Register Start : 0 # Starting DB address where read by processor
Read Register Count : 800 # Number of regs for processor to read
Write Register Start : 800 # Starting DB address where write data placed
Write Register Count : 400 # Number of regs to write to module from processor
Error/Status Offset : 3800 # Location of port error/status offset data
Failure Flag Count : 0 # Determines if BP failure will cause protocol to be
Initialize Output Data : No
[HART Port 0]
Enabled : Yes # Y=Use port, N=Do not use port
Preambles : 5 # Number of Preambles to be sent to HART Network
Primary Master : Yes # Y=The Master is Primary N=Secondary
Retry Count : 3 # Number of retries after error
DB Address Status : 3600 # Database Address to place device status
Command Count : 3 # Number of Commands in Command Table
Auto-Poll Code : p2p # P=p2p, M=multidrop, N=Not used
Auto-Poll DB Address : 0 # DB address for auto-poll data
Auto-Poll Swap Float : Word and Byte Swap # Swap code for auto-poll float data
Max Device Count : 1 # Maximum device address number in the network (1-15)
Error/Status Offset : -1
[HART Port 0 Commands]
START
Enable Float DB Address Poll Interval FP Word Count FP Swap Code S
1 Disabled 0 0 0 No Change 1
2 Disabled 0 1 0 No Change 1
END

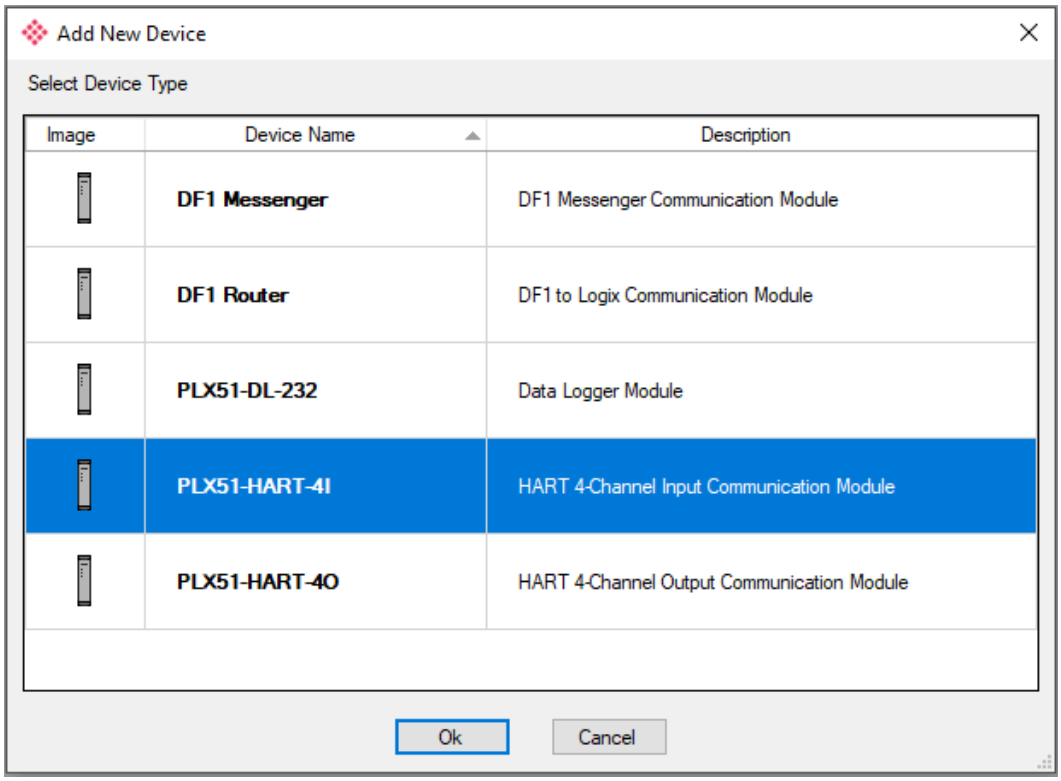

Edit - Module
Read Register Start 0
Read Register Count 800
Write Register Start 800
Write Register Count 400
Error/Status Offset 3800
Failure Flag Count 0
Initialize Output Data No
Read Register Count
800
Comment:
Number of regs for processor to re
Definition:
Number of regs to read from module for processor.

5. Launch **ProSoft PLX50 Configuration Utility** and create a new project.

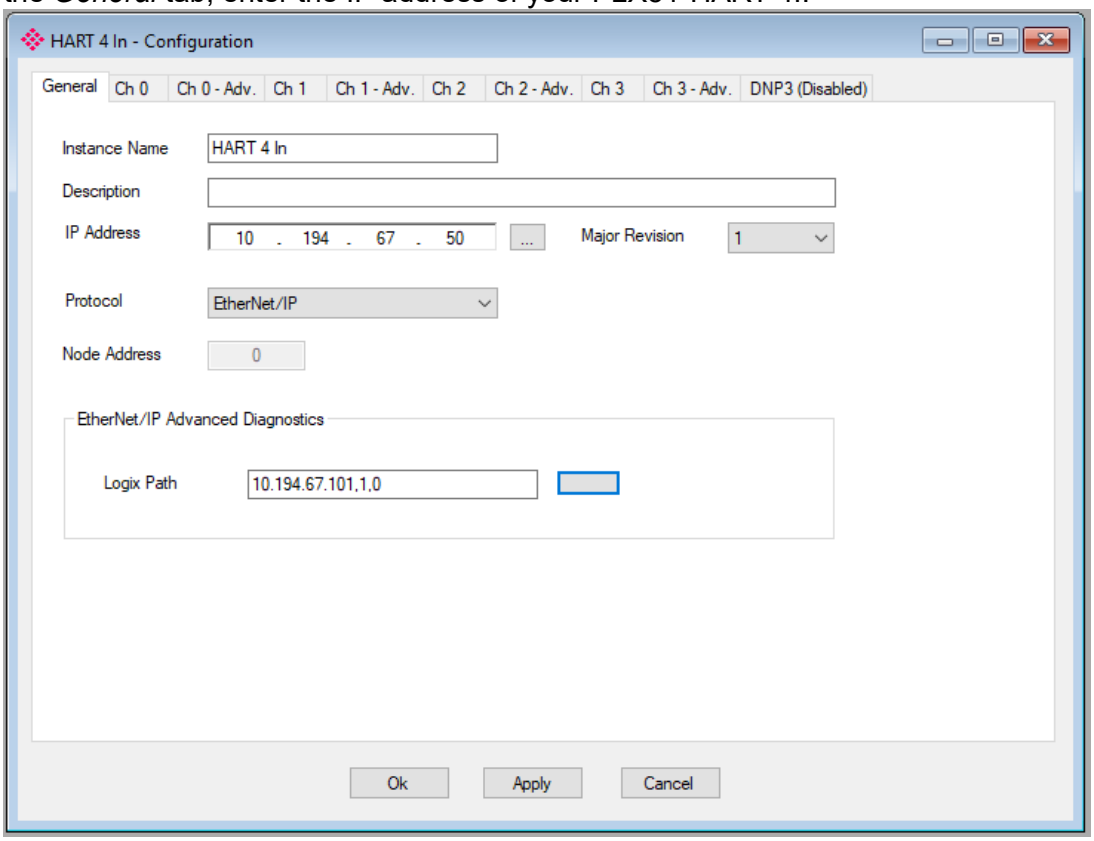


6. Then add a **PLX51-HART-4I** by selecting **Add** under the *Device* menu, and click **Ok**.



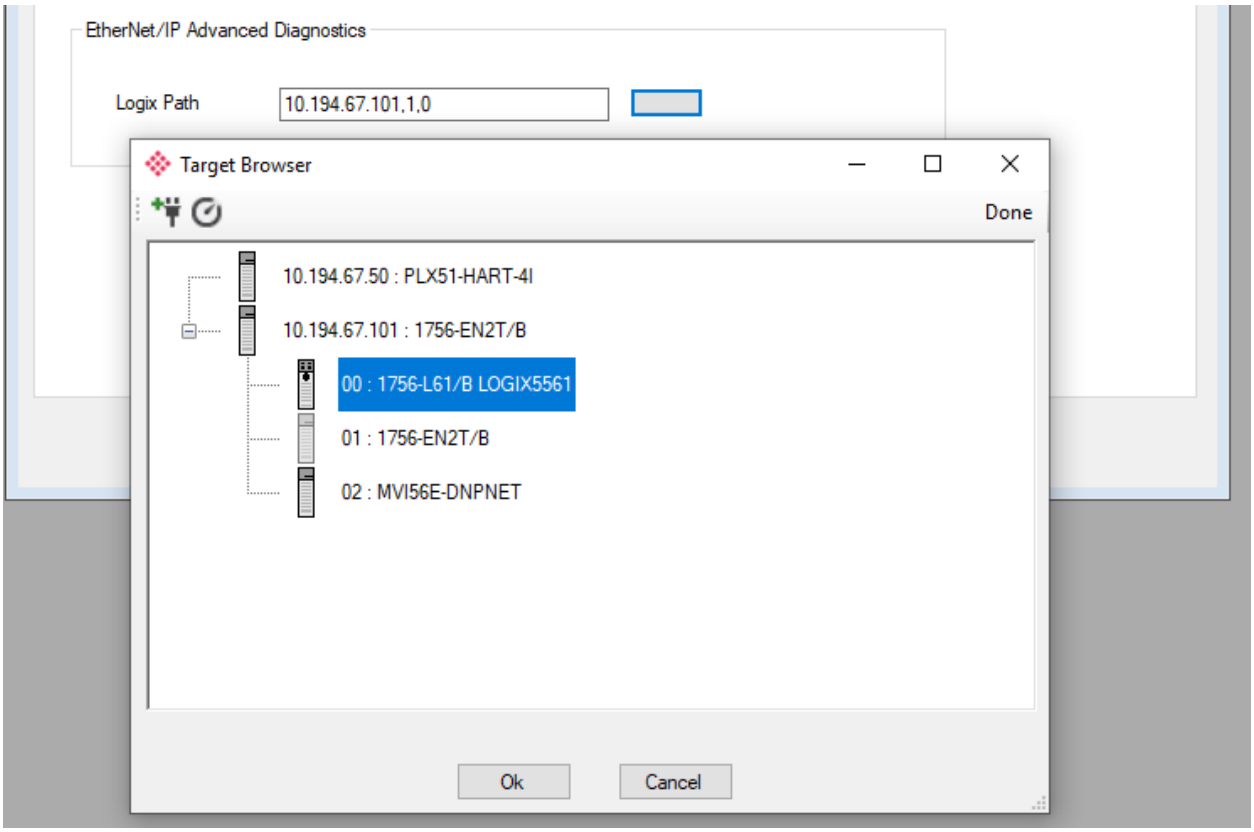


7. In the *General* tab, enter the IP address of your PLX51-HART-4I.



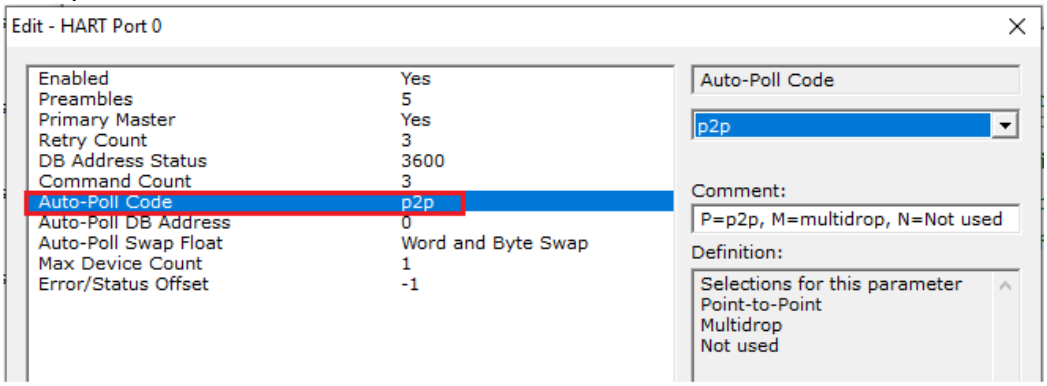
You can also browse for connected devices by clicking the "…" button on the right of the IP address field.

8. Select **EtherNet/IP** under *Protocol*. If you would like the Advanced Diagnostics to be written to your Logix Controller, click the Logix Path **browse** and select your controller from the list, confirm by clicking **Ok**.

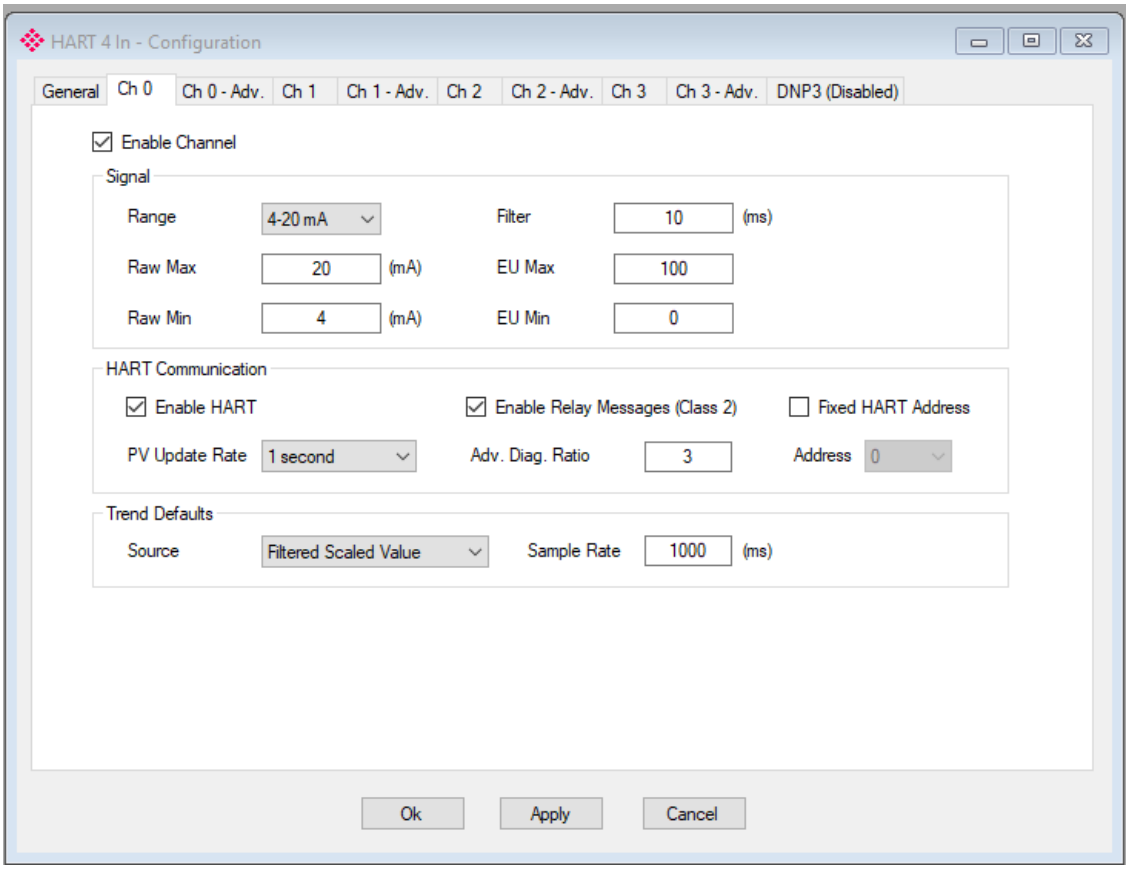


9. Next, we will look at the port setting for both Point-to-Point and Multidrop. In the different "Ch. X" tabs, select the right parameters for your application if the defaults do not match.

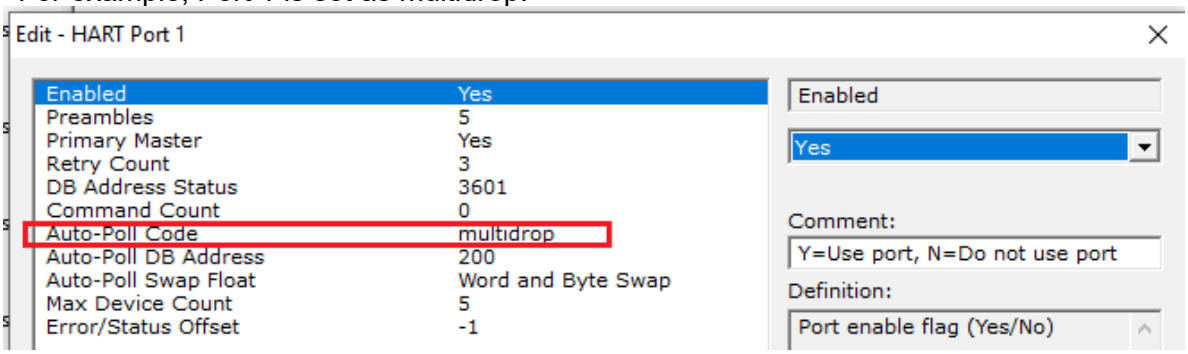
a) For example, Port 0 is set as Point-to-Point:



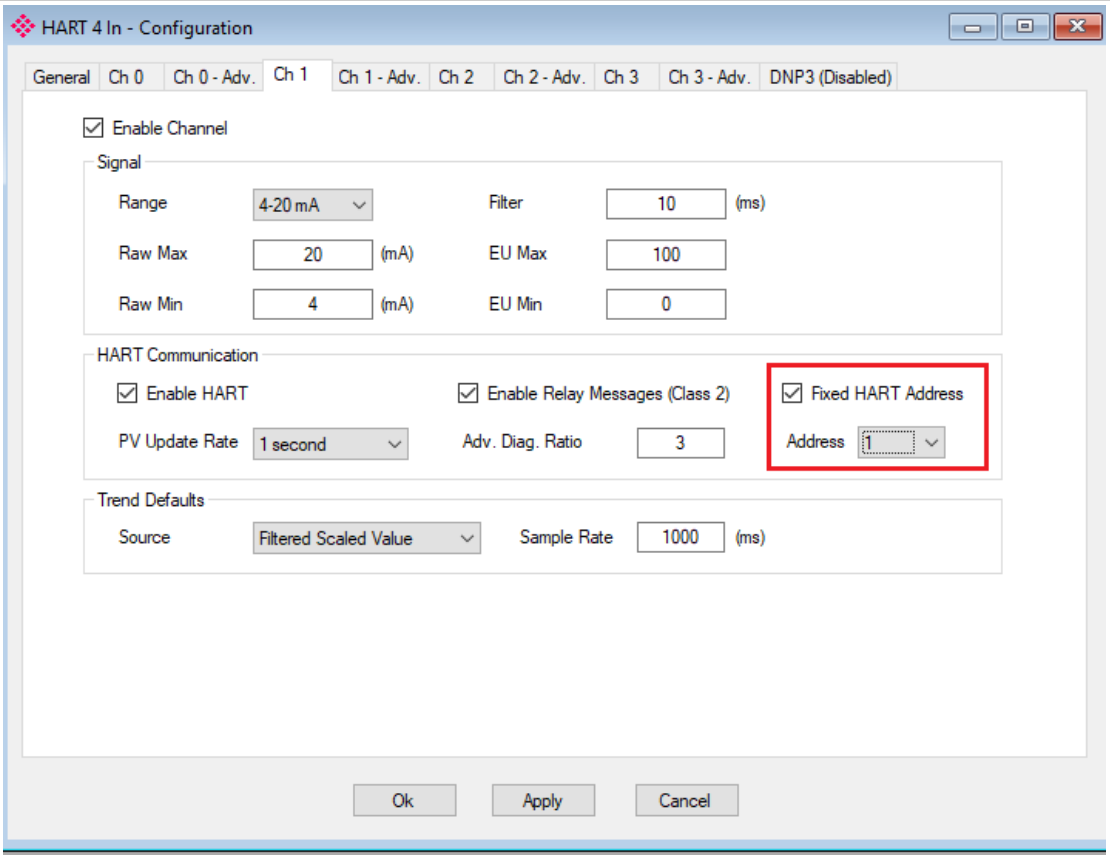
The default setting should be sufficient, unless you want to discover the filter and trending features.



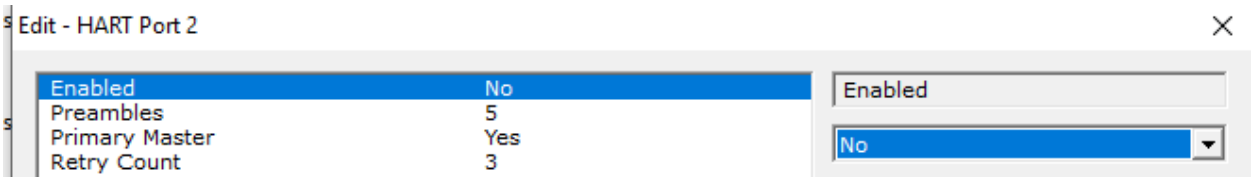
b) For example, Port 1 is set as multidrop:

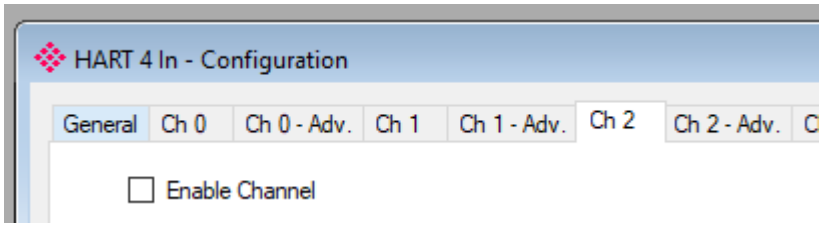


In multidrop setting, to ensure the correct field device is used as the “main” field device on the drop (which will be used to populate the Logix input assembly), the user will need to set the **node address** of the specific device. This is done by setting the **Fixed HART Address** parameter in the PLX50 Configuration Utility as shown below:

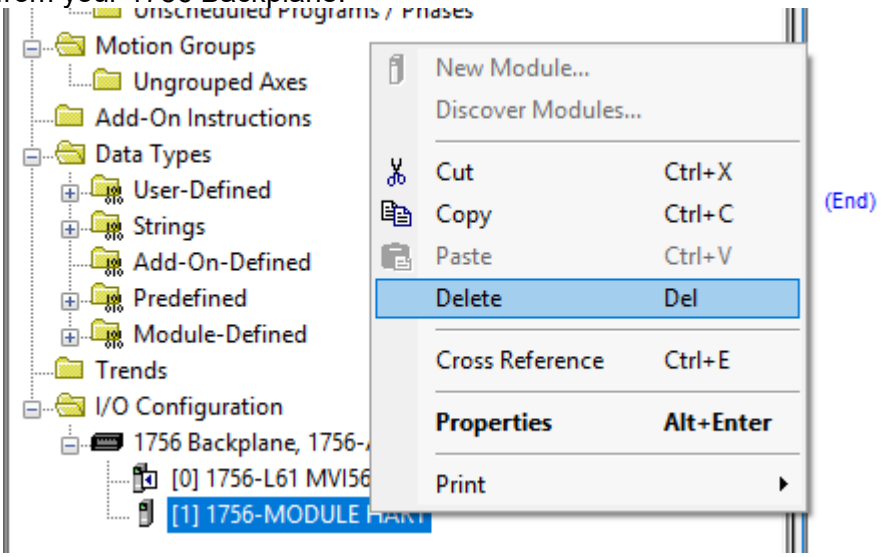


c) If the Port in MVI56-HART is not enabled, you may disable it in PLX51-HART-4I by untick the **Enable Channel** box.

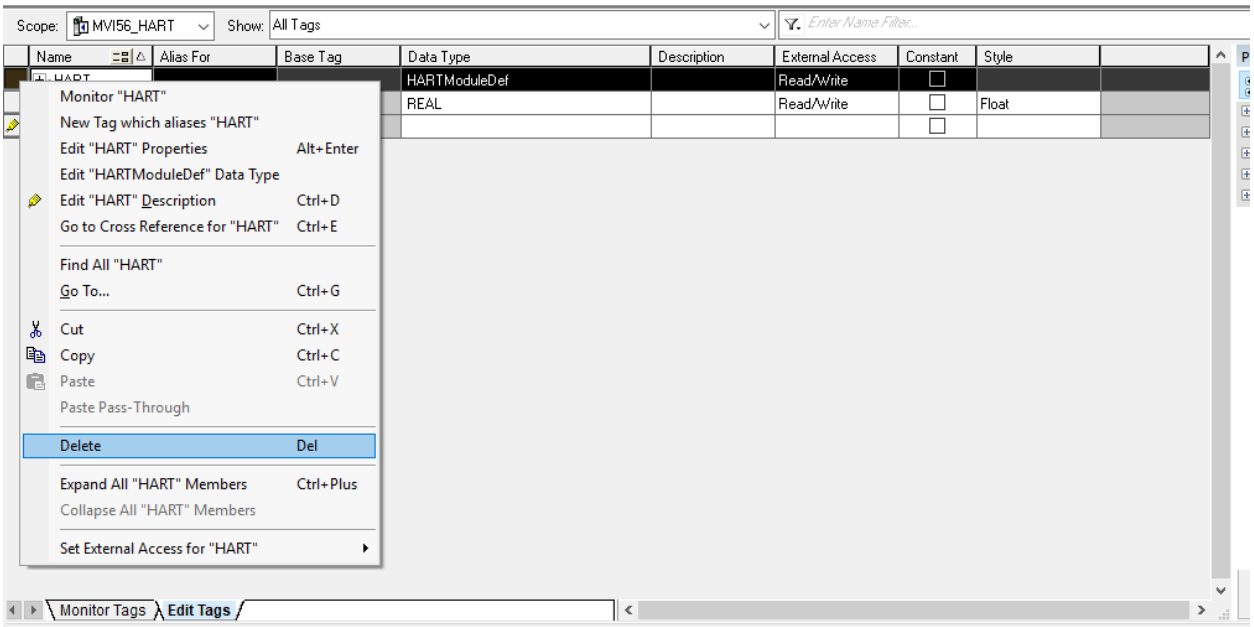




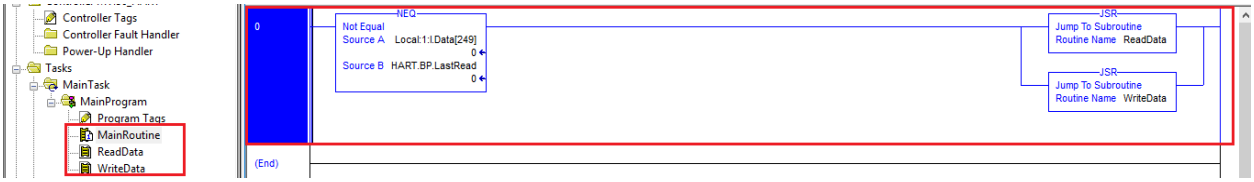
10. Open up your existing RSLogix/Studio 5000 program back up copy, delete the **MVI56-HART** module from your 1756 Backplane.



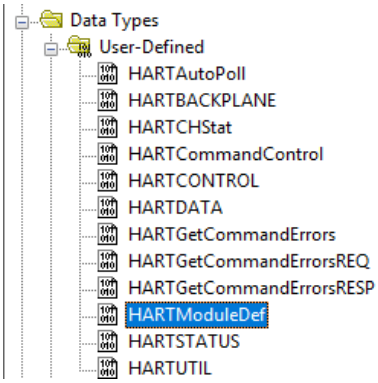
11. Delete the **HART** tag from *Controller Tag*, under *Edit Tags* tab.



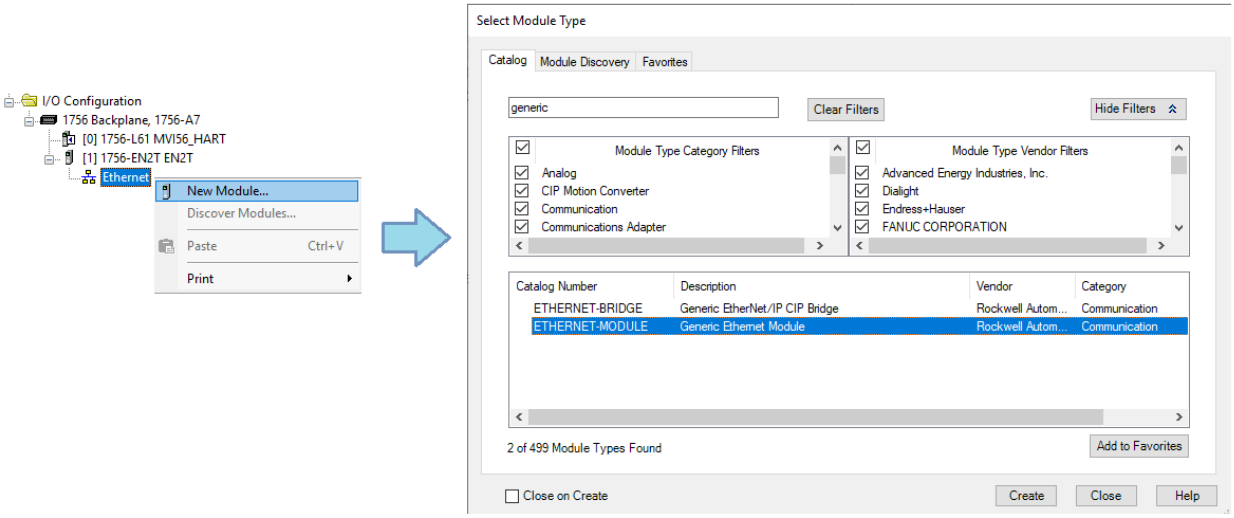
12. Then delete the rung used for MVI56-HART module. The rungs consist of a *NEQ* instruction to *HART* tags, with two *JSR* on **Main Program**, then a **ReadData** and **WriteData** rungs.



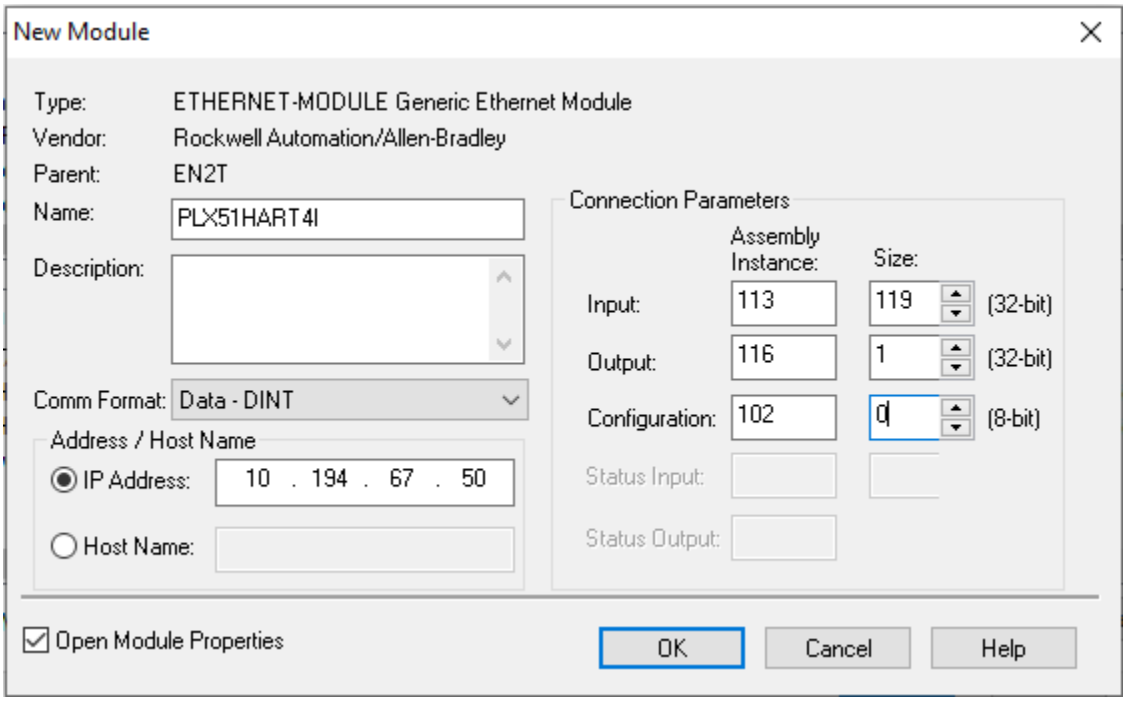
13. You may delete the associate UDT (all as shown below), but this is optional. If you would like to delete them, you will need to delete **HARTModuleDef** first as other UDT are used in this one. Then right click and delete them one by one. If *Delete* are grey out, you will need to delete other UDT first, as it is used elsewhere.



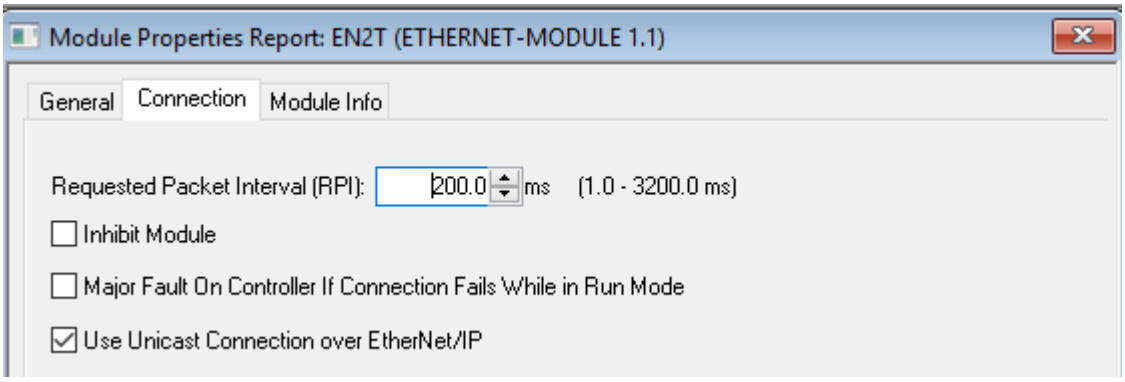
14. Now add the PLX51-HART-4I module, it must be added to the RSLogix 5000 I/O tree as a *Generic Ethernet module*. This is achieved by right-clicking on *the Ethernet Bridge* (For example 1756-EN2T) in the *1756 Backplane* and selecting *New Module*. Then select **ETHERNET-MODULE** as shown in the figure below.



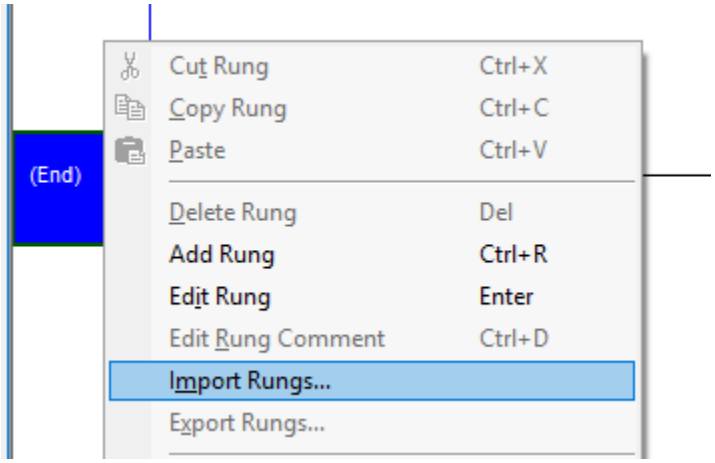
15. You must enter the IP address of your PLX51-HART-4I module. The assembly instance and size must also be added for the input, output, and configuration in the connection parameters section as shown below. You will need to enter the exact connection parameters before the module will establish a Class 1 connection with the Logix controller.



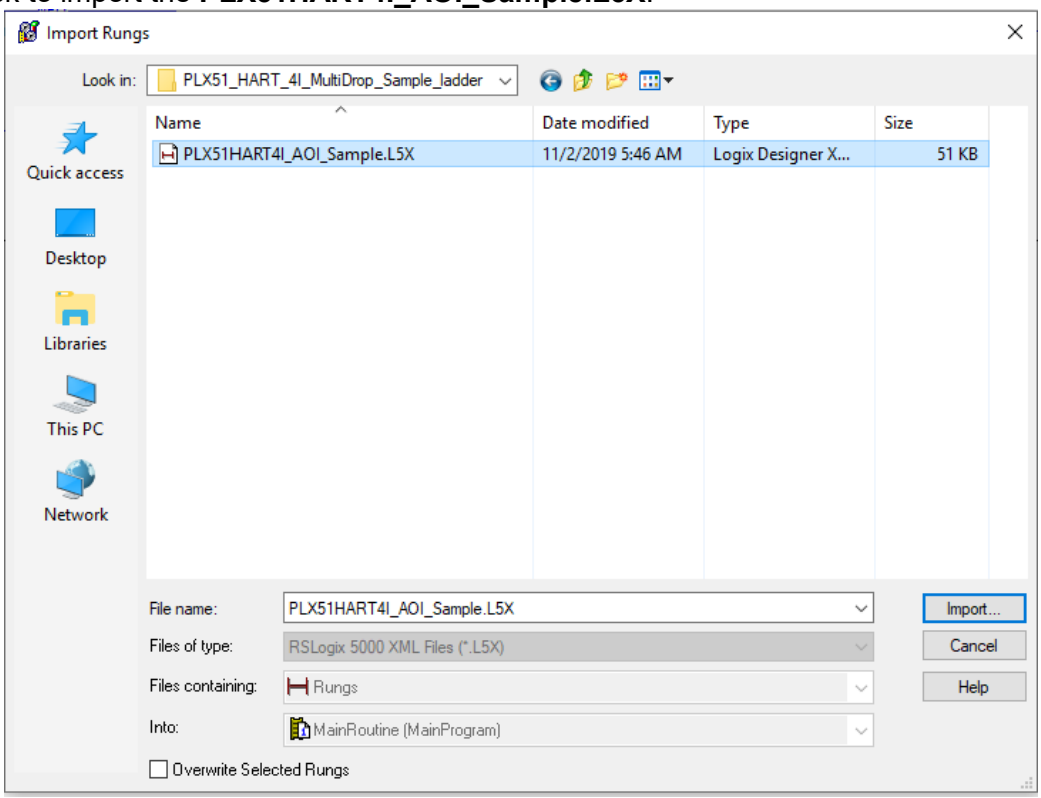
16. Add the connection requested packet interval (RPI). This is the rate at which the input and output assemblies are exchanged. The recommended value is 200ms.



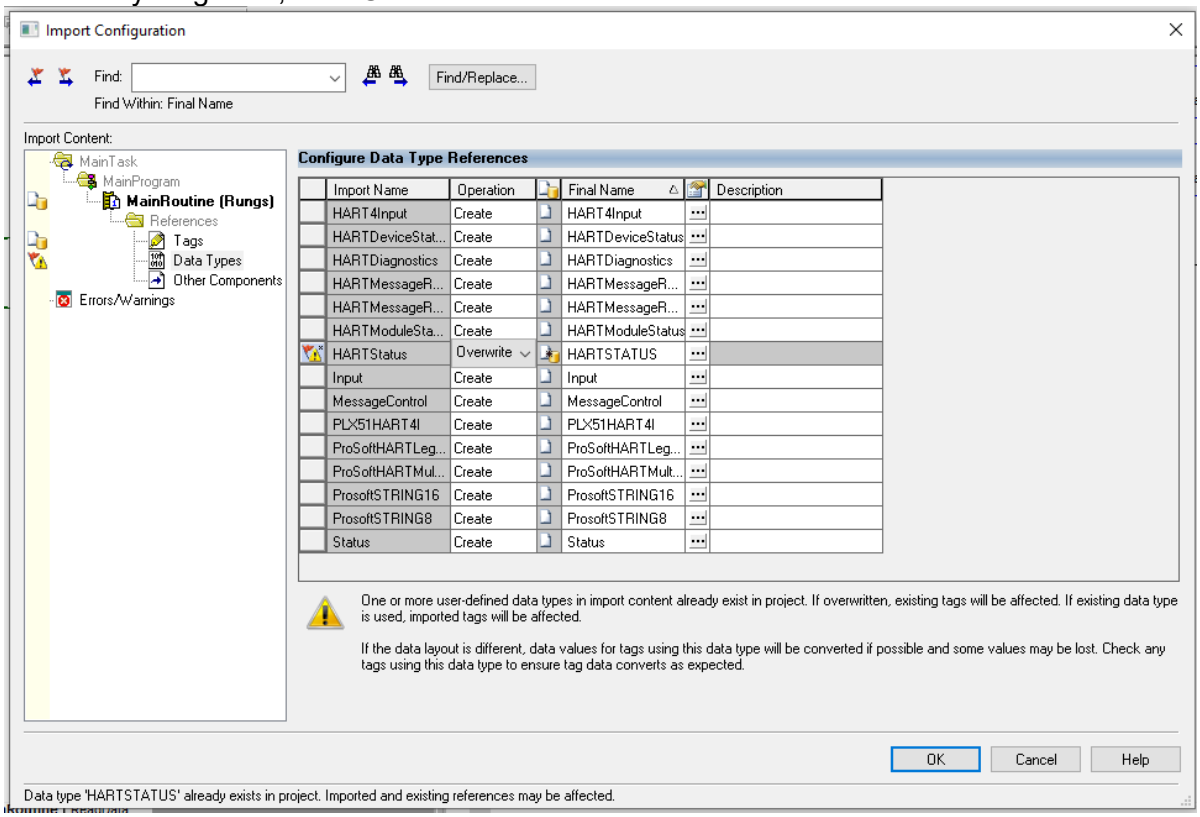
17. In *Main Program*, right click and click **Import Rungs**, the sample ladder can be found on PLX51-HART-4I webpage, download section. (PLX51-HART-4I Multidrop Sample Ladder file)



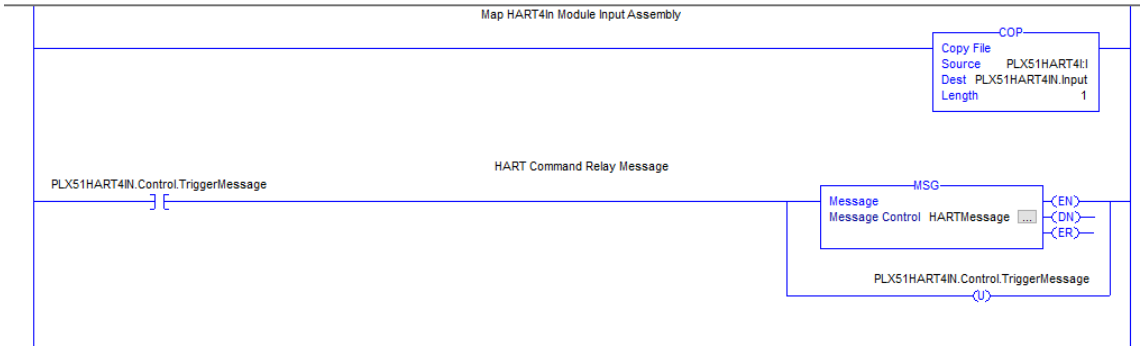
Click to import the **PLX51HART4I_AOI_Sample.L5X**.



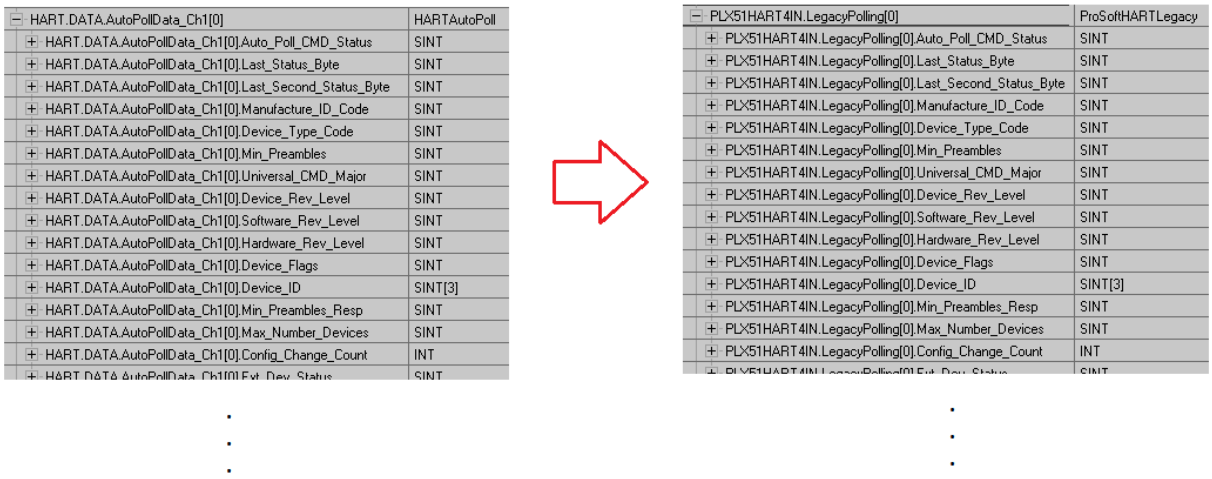
18. Then you will need to run thru each tab to make sure they are no overlapping of the *Tags*, *Data Types* and *Other Components*. If you did not delete the **Data Types** earlier, you have to take note that **HARTStatus** are overlapping, you have to opt for **Overwrite** operation. After everything is ok, click **Ok** to confirm.



19. After import success, you will have the AOI in your Main Program.



20. Now you have to change the mapping source from old MVI56-HART Controller Tags to PLX51-HART-4I Controller Tags accordingly. The Multidrop Sample Ladder as of Nov 2nd 2019 have included ProSoftHARTLegacy UDT, which has similar data structure as HARTAutoPoll UDT on MVI56. These will ease the migration from MVI56 to PLX51.



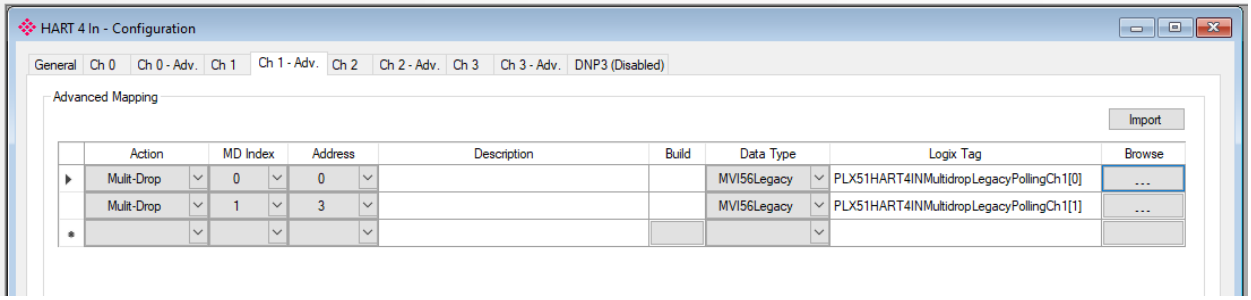
HART.DATA.AutoPollData_Ch1[0]	HARTAutoPoll
HART.DATA.AutoPollData_Ch1[0].Auto_Poll_CMD_Status	SINT
HART.DATA.AutoPollData_Ch1[0].Last_Status_Byte	SINT
HART.DATA.AutoPollData_Ch1[0].Last_Second_Status_Byte	SINT
HART.DATA.AutoPollData_Ch1[0].Manufacture_ID_Code	SINT
HART.DATA.AutoPollData_Ch1[0].Device_Type_Code	SINT
HART.DATA.AutoPollData_Ch1[0].Min_Preambles	SINT
HART.DATA.AutoPollData_Ch1[0].Universal_CMD_Major	SINT
HART.DATA.AutoPollData_Ch1[0].Device_Rev_Level	SINT
HART.DATA.AutoPollData_Ch1[0].Software_Rev_Level	SINT
HART.DATA.AutoPollData_Ch1[0].Hardware_Rev_Level	SINT
HART.DATA.AutoPollData_Ch1[0].Device_Flags	SINT
HART.DATA.AutoPollData_Ch1[0].Device_ID	SINT[3]
HART.DATA.AutoPollData_Ch1[0].Min_Preambles_Resp	SINT
HART.DATA.AutoPollData_Ch1[0].Max_Number_Devices	SINT
HART.DATA.AutoPollData_Ch1[0].Config_Change_Count	INT
HART.DATA.AutoPollData_Ch1[0].Ext_Dev_Status	SINT

PLX51HART4IN.LegacyPolling[0]	ProSoftHARTLegacy
PLX51HART4IN.LegacyPolling[0].Auto_Poll_CMD_Status	SINT
PLX51HART4IN.LegacyPolling[0].Last_Status_Byte	SINT
PLX51HART4IN.LegacyPolling[0].Last_Second_Status_Byte	SINT
PLX51HART4IN.LegacyPolling[0].Manufacture_ID_Code	SINT
PLX51HART4IN.LegacyPolling[0].Device_Type_Code	SINT
PLX51HART4IN.LegacyPolling[0].Min_Preambles	SINT
PLX51HART4IN.LegacyPolling[0].Universal_CMD_Major	SINT
PLX51HART4IN.LegacyPolling[0].Device_Rev_Level	SINT
PLX51HART4IN.LegacyPolling[0].Software_Rev_Level	SINT
PLX51HART4IN.LegacyPolling[0].Hardware_Rev_Level	SINT
PLX51HART4IN.LegacyPolling[0].Device_Flags	SINT
PLX51HART4IN.LegacyPolling[0].Device_ID	SINT[3]
PLX51HART4IN.LegacyPolling[0].Min_Preambles_Resp	SINT
PLX51HART4IN.LegacyPolling[0].Max_Number_Devices	SINT
PLX51HART4IN.LegacyPolling[0].Config_Change_Count	INT
PLX51HART4IN.LegacyPolling[0].Ext_Dev_Status	SINT

21. For multidrop, you may utilize the Advanced mapping features to map data to MVI56Legacy UDT (ProSoftHARTLegacy UDT in Logix). You may create and name new Logix tag as you like but the tag must use ProSoftHARTLegacy UDT. For this example, I am using **PLX51HART4INMultidropLegacyPollingCh1** and make it array of 7, for 7 HART devices that each channel can support.

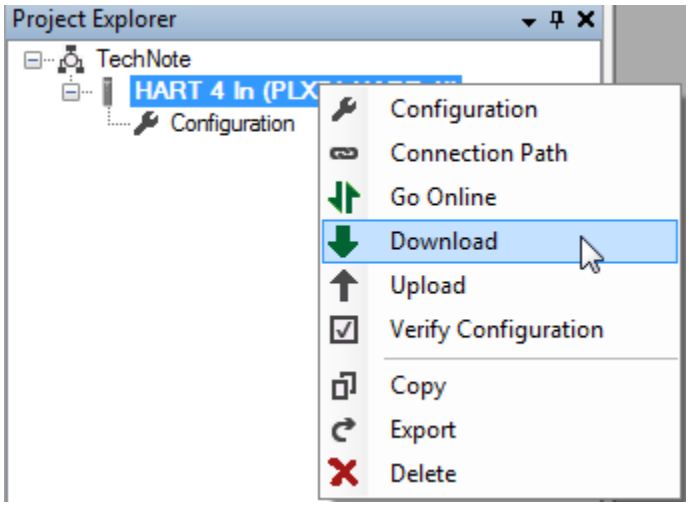
PLX51HART4INMultidropLegacyPollingCh1	ProSoftHARTLegacy[7]
PLX51HART4INMultidropLegacyPollingCh1[0]	ProSoftHARTLegacy
PLX51HART4INMultidropLegacyPollingCh1[1]	ProSoftHARTLegacy
PLX51HART4INMultidropLegacyPollingCh1[2]	ProSoftHARTLegacy
PLX51HART4INMultidropLegacyPollingCh1[3]	ProSoftHARTLegacy
PLX51HART4INMultidropLegacyPollingCh1[4]	ProSoftHARTLegacy
PLX51HART4INMultidropLegacyPollingCh1[5]	ProSoftHARTLegacy
PLX51HART4INMultidropLegacyPollingCh1[6]	ProSoftHARTLegacy

22. In PLX50 Configuration Utility, go to Adv tab of your multi-drop channel, put the address of your HART devices and put the Logix tag name accordingly. For example:

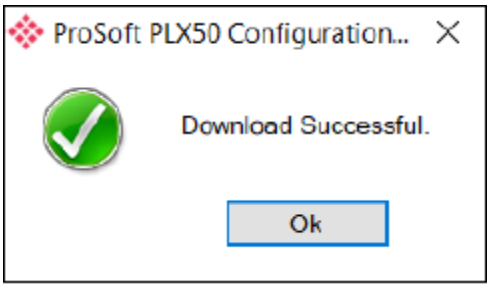


Then you map them accordingly in your Logix program as you do on pointer 20 for p2p application.

23. Download configuration to the gateway (right click on gateway and select **Download**) from PLX50 Configuration Utility .



24. Once complete, you will be notified that the download was successful.

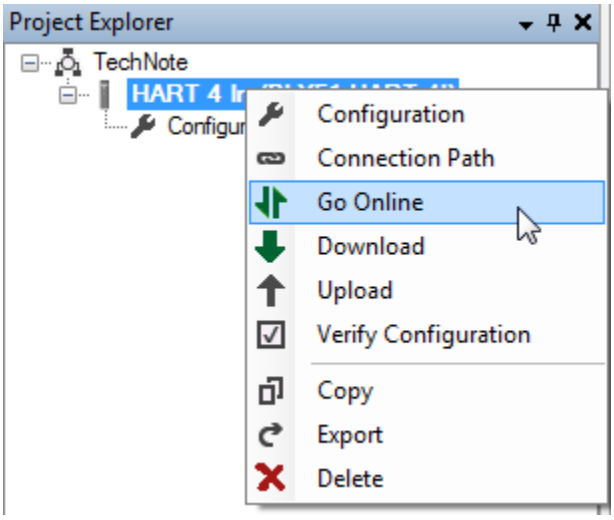


25. In Logix, before complete, click to verify the controller. All the unmapped tags will be shown up in error. You may go through one by one to check the advanced setting that you was using with your MVI56-HART earlier and replace them accordingly with PLX51-HART-4I features.

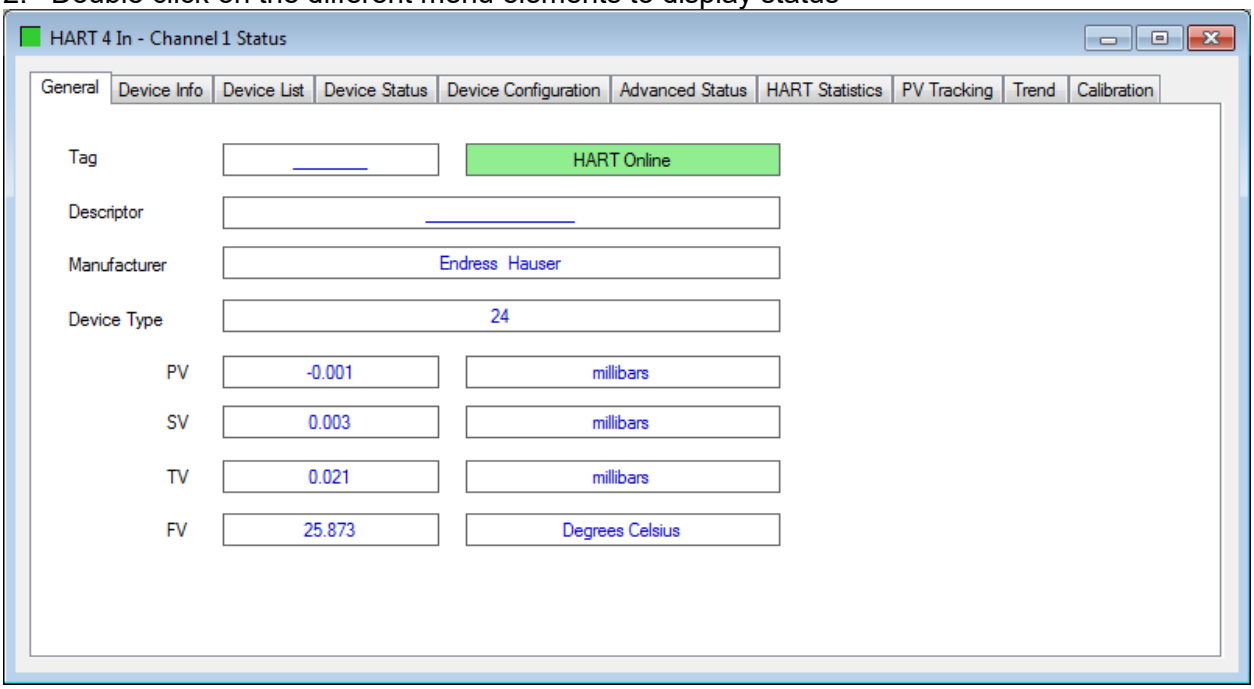
Troubleshooting

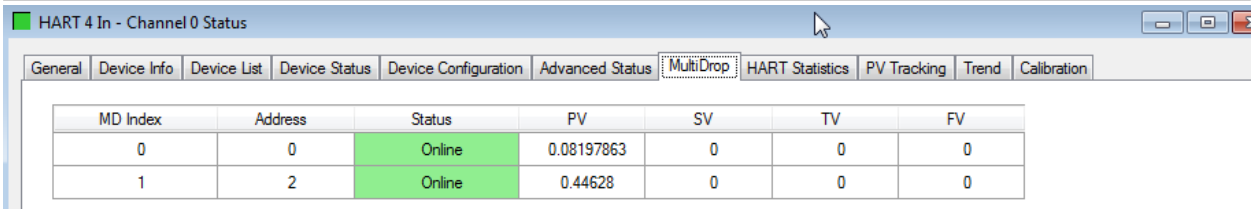
When going online with the module, you can access different module and HART status information. It would also allow you comparing HART variables to what you see in your EtherNet/IP tags.

1. Right click on module and select “Go Online”.



2. Double click on the different menu elements to display status





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_____END OF TECHNICAL NOTE_____